

# COAL AGE

The Weekly Journal of the Coal and Coke Industries

Volume 18

NEW YORK, THURSDAY, JULY 8, 1920

Number 2

## *Two Problems: Tackle Both*

**T**WO fundamental problems are present in the coal situation today. First and foremost is the need of increased production, which calls for more transportation. Production to meet the demand will retire all other questions, but until that production is forthcoming the problem of distribution must have attention.

Absolute observance of the Interstate Commerce Commission order that open-top cars be used only for coal will, if extended beyond the original thirty days, increase the coal output to a satisfactory point, provided also, of course, that the railroads move the cars and do not sidetrack and forget them. There is more to the job of getting sufficient coal moved than issuing an order or a dozen orders. The railroad organization is complex, divers motives compel its acts and today labor for its operation is lacking both in numbers and in co-operative spirit.

We would suggest for the consideration of the chairman of the Interstate Commerce Commission that real lively interest in getting the car supply for the coal mines back to normal would follow were the railroads compelled to meet the market in the purchase of such free coal as may be required. Remove the assigned car, put the carriers on the same basis as regards price as the public at large, and there will be real incentive provided for the railroad organization to get on its toes and move coal. If railroads were like other people and had to take pro rata shipments on contracts shrunk by reduced car supply, and had to buy in the open market what they were short, their interest in car shortage would be more than academic. Real, honest pressure, beginning with the financial interests behind the roads and extending down the line to the lowest official, would surely be exerted were assigned cars prohibited. There is ample reason for saying that the railroads must have their coal before others are supplied, but no reason exists for giving them coal at prices lower than the public. The assigned car practice does more, for it raises the price to the public in proportion as it lowers it for the railroads. If Chairman Clark will not recede from his position on this question, it appears that the courts are disposed to do it for him.

We find few who expect production of bituminous coal to be so increased in the next three or four months that all danger of serious trouble can be averted this winter. Distribution of what is produced will therefore be a matter of great importance and will assume even more so than today the aspect of a national problem. Without abating for one instant the call for greater output of coal, we cannot minimize the necessity for proper distribution of what modicum is produced.

With respect to distribution the coal industry finds itself, as it did in 1917, in a more or less helpless position because the tonnage that is coming forth is largely

under contract. It is the ordinary practice for coal operators each spring to contract to deliver in the coming year from 50 to 75 per cent of normal capacity. Because of car shortage few operators are today producing sufficient coal to meet contracts and, of course, have little or no coal free to satisfy the needs of the consumers who last spring did not contract for a supply. We believe that 90 per cent of the production is today leaving the mines under contract. The free coal, the remaining 10 per cent for which prices as high as \$15 per ton have been offered, comes largely from operators with mines the limit of output of which is from one car to two or three per day. The large, responsible companies, in both anthracite and bituminous fields, are holding prices of such free coal as they have to offer at a level that is not objectionable and that in many instances is barely above the excessive cost of production brought about by the reduced running time of today.

Railroads, public utilities and domestic consumers will be conceded as having first call for coal, from purely social reasons. But a shipper of coal who has among his contractors industrial consumers as well as public utilities is under contractual obligations to ship equal proportions of his output to each in accordance with the relation the individual contracts bear to his total obligations. In other words, most producers of coal are not free today to ship their product where public interest may indicate lies the greater need.

The present policy of temporizing with the distribution problem will lead to serious trouble this fall and winter as it did three years ago. No good can come from plastering one transportation priority on top of another. The personnel of the Interstate Commerce Commission is no more qualified to handle national distribution of coal than was Dr. Garfield personally. Dr. Garfield called the coal operators to his assistance; so should those at Washington attempting to handle the situation.

Either leave distribution of coal to the coal producers entirely or invite them to Washington to do the work for the government. If the combined judgment of the commission, the railroads and the coal men is that control of distribution is necessary, the way can be found to make it effective.

The decision as to whether control of distribution is necessary or advisable should not be made solely on the representations of the governors of states and managers of public utilities; it is on such a basis that regulation has been begun. Nor is the shortage of coal of like magnitude in Minnesota and Kansas, nor the difficulties of transportation as great in Colorado as in Pennsylvania. The coal men know the game and to the coal men the Government should turn for advice and assistance when the Government is dealing with the situation.

### *Cushing on Coal Prices*

GOVERNMENTAL control and regulation have not been the causes of the rise in the level of coal prices, as Mr. Cushing would lead us to think by his excellent review of the situation as published in the issue of *Coal Age* of June 10. Mr. Cushing is a most active and persistent exponent of *laissez faire* in the attitude of the Government to industry and in that belief he represents the opinion of a solid majority in the coal trade. But let no one conclude, as he implies, that the "artificial force" of Government regulation "froze" prices at the new high level. He aptly points out that the four years 1917-1920 stand alone in a hundred years of coal history because of the change in prices, and it is more nearly true than the reverse that this is the only period when the coal business was uniformly profitable and yet failed to bring a great overproduction of coal.

The only possible deduction to be drawn from this, according to Cushing, is that detailed Government interference with the coal industry reverses its usual effect by bringing about a period of uncertain supply, which results in a sustained period during which uniformly profitable prices apply. He only notes in passing that this period of high prices was and is co-existent with a period of detailed control of transportation. He finally admits that it is undubitably true that after all transportation shortage was responsible for the high price of coal.

There is sufficient reason to anticipate some sort of Federal regulation of—or should it be interference with—the coal industry to make it feasible for us to consider the arguments pro and con, using calm judgment and giving due thought to the subject before and not after the deed. Plainly, the causes for the marked rise in coal prices from 1917 to date, with one exception—a part of 1919—were outside and not inside the industry. During this period of four years, in which there has been a shortage of coal compared with the demands of consumers, the developed capacity of bituminous coal mines has been more than ample to supply requirements. The anthracite field is not so favored, and the cause for such shortage as has existed there—small in comparison with that in the bituminous regions—has been due to labor shortage.

The first notable rise in prices of bituminous coal, in 1917, was due to excess of demand over supply, a result of car shortage. The next pronounced rise followed a wage advance authorized by the Fuel Administration in October, 1917. Prices were more or less stationary during 1918 and 1919, varying only locally, to be followed by a rise on April 1, 1920, when a large increase in wages was awarded the mine workers by the Bituminous Coal Commission. The present marked upward climb is again due to a pronounced car shortage.

The drop in prices that under pre-war conditions might have followed the slump in demand in the first six months of 1919 did not materialize, and here we find the one exception to the generalization that for four years prices have been dependent on conditions outside the industry.

The coal men had learned what it was costing them to produce coal, something they had not known before. And knowing cost, a majority of the individual operators elected not to sell below that cost. Therefore when cost did not go down when demand and production slumped after the armistice, prices did not recede.

The only effect of Government regulation was the education of the coal producer. The local organizations of operators stiffened the backbone of the individual.

The net result was a stabilizing of the industry. Let no one harbor the idea that further Government regulation will *per se* still further increase prices. And let each distinguish between prices and profits.

### *Many Men and Kegs of Powder*

QUITE correctly the Bureau of Mines, in its annual report on accidents, in speaking of the value of the Baltimore tunnel disaster as a lesson to executives and mine workers, says that the question of whether electricity was responsible should not obscure the importance of a due "consideration of the various dangers which arise in underground transportation and handling of explosives." It might be well to note that transportation was not of the essence of the fatality, and that seems to be recognized by Mr. Fay, for, as quoted, he adds to "transportation" the "underground handling of explosives."

Wherever there are many men together and a keg or kegs of powder there is a possibility of accidents ranking in horror almost with that just instanced, in which it will be remembered that ninety-two lives were lost. There are some who lay so much stress on transportation that they think that powder can be taken inside in bulk and the mine workers allowed to scramble over one another with open lights to get it when it arrives. The distribution of it underground is as important as its transportation. Care should be taken, when the car of powder, protected by all manner of covers and constructed of wood planks and pegs, arrives at its destination that it is not met by a lot of hurried, excited miners with open lights, each seeking to grab his keg first.

Unless arrangements are made to take care of the distribution of the powder kegs great danger is introduced by the use of a powder trip, for it arranges that in a single car, or at best two cars, enough powder will be carried to serve for a single shift. No more disastrous place could be found for an explosion of this kind than the face of a working heading. Order in distribution of powder and security in its storage at the working heading, even when it is only temporarily stored, is an essential requirement, and these provisions are hard to secure with undisciplined mine forces. Orderly transportation could not be secured at the Baltimore Tunnel. The union demanded a wrong method of transportation; it finally agreed on certain modifications of that method and promised to require compliance from all its members, but this compliance it most grievously failed to enforce.

Orderly storage and distribution in working headings is not as safe as the carriage by each man of his own keg. However, it is safer than carrying powder on man trips, especially if discipline is observed.

Wholesome indeed is the fear that the average man has of powder. Unfortunately, however, it only too soon wears off, and caution gives way to risk taking. Most powder accidents are unnecessary and can be explained only by recalling the misplaced confidence that arises after long use and the exuberant thoughtlessness of men which finds greatest expression in the freshness of the early morning and when the hours for baseball and other relaxation approach.

### Germany Tardy with Coal

Germany is three million tons in arrears of her engagements for the delivery of coal in execution of the Treaty of Versailles, according to a statement by Louis Loucheur printed in the *Petit Parisien*.

### Urges Operation of Roads as a Unit

Relief of transportation difficulties through operation of the railroads of the country "as a unit" was proposed by William B. Colver of the Federal Trade Commission in an address before the Washington Ad Club. Mr. Colver predicted that a continuation of the present situation would mean "untold suffering and industrial shutdowns next winter." Hundreds of millions of dollars are tied up now in merchandise in sidetracked cars, he said, keeping from the market badly-needed capital.

### Anthracite Mine Workers Present Their Case

On June 28 the ubiquitous Jett Lauck appeared before the Anthracite Wage Commission and presented the case of his clients in twenty-one exhibits. The session lasted one day and at its conclusion was adjourned till July 7 so as to give the operators time to prepare their evidence in rebuttal. Details of the conference and the exhibits presented by Mr. Lauck will be found on pages 80-82 of this issue.

### May Have State Coal Mine

Governor James P. Goodrich of Indiana has approved the purchase and operation by the state of a coal mine in order to insure State institutions of an adequate supply of coal. This action was recommended by the State Purchasing Committee. Money to carry out the project will be asked of the state Legislature, which Governor Goodrich has announced he will call in special session soon. The state's coal contracts expire June 30, and, according to a resolution prepared by the purchasing committee, it has received no bids in response to advertisements for the purchase of coal for state institutions during the coming year.

### Freight Rate Increase of 55½ Per Cent?

An increase of 55½ per cent in freight rates will result if the roads' demands for increased freight tariffs and the men's demands for increased pay are granted, and the whole burden will be placed on the freight traffic in the opinion of Clifford Thorne, representing Chicago shippers. Mr. Thorne recommended to the Interstate Commerce Commission that the wage advances be added, without further hear-

ings, to the costs upon which the roads now base their request for advanced freight rates, that a 5 per cent increase be made in passenger rates, with the balance of freight tariffs to care for the present case, and that any advance occasioned by the wage decision be spread out over the entire earnings of the railroads from all sources.

### English Roads Also Congested

That even in England trouble is experienced in curtailing exports is evident from the report in the *Journal of Commerce* that in the western part of South Wales "there are 20,000 tons of coal ready in the wag-

## NEWS BRIEFS

### Terse Items Chronicling Events of Interest to the Industry

ons which cannot be got away. These wagons are in the sidings, and although shipping is waiting the coal cannot be sent away by reason of the limitation of exports of coal. Nor can it be sent inland."

### B. R. T. Borrows Coal

Because of the depletion of its coal supply, the Brooklyn Rapid Transit Company, under the pooling arrangement agreed to by the public utilities, last week borrowed 1,000 tons from other companies, and may have to take further similar steps to maintain operation.

### Court Enjoins Assignment of Cars by B. & O.

The Baltimore & Ohio R. R. has been ordered by the Federal Court to cease the practice of assigning cars for fuel coal, in accordance with the plea of the Lambert Coal Co. in the Fairmont field of West Virginia. The injunction becomes effective July 20, the delay having been granted by the court at the request of the railroad and with the consent of the coal company.

### Production of Coal in British Columbia

Production of coal in British Columbia for the five months ended with May was approximately 1,250,000 net tons, about the same as in 1919.

### Philadelphia Electric Gets Priority Order

The Interstate Commerce Commission has given the Philadelphia Electric Co. a priority order for coal. This is Order No. 8 and provides for a supply of 12,000 tons for that company. The order specifies the Rockhill Coal and Iron Co. as the shipper and the Pennsylvania and East Broad Top Railroad and Coal companies as the carriers. The order is justified as an emergency to protect the peace, health and welfare of the people of Philadelphia.

### Coal Exports from New York in May

Bituminous coal exported from the Port of New York in May amounted to 17,000 net tons—5,600 tons to Austria, 5,200 tons to France, 3,000 tons to Norway and 1,700 tons to Italy. The balance was in small lots to six other foreign lands. This is the largest record for this port for the same month in many years.

### Sues Chesapeake & Ohio

The Leeval Coal Co. has entered suit in the Kanawha Circuit Court in Charleston, W. Va., against the Chesapeake & Ohio Railroad Co. to test the right of the railroad to give preferences in assigned cars to coal mines furnishing fuel coal to the railroads. While the suit is in the name of that Leeval Co. it is understood that practically all operators in the Kanawha, New River and Guyan Valley fields which have no railroad contracts are interested.

### Wants Practical Men on Rail Boards

In an address at the City Club, Washington, D. C., William N. Doak, vice-president of the Brotherhood of Railway Trainmen, declared that in his opinion there can be no industrial peace in the railroad world until the question of rates of pay for employees is separated from the arena of politics. "The only real solution," he said, "is by the application of commonsense methods, by the creation or maintenance of boards, be they either local or general, in which the employer and the employee are equally represented and where the responsibility is placed upon practical railroad men."

### No Cars Assigned Under Order No. 6

The New York Central has notified coal shippers on its lines that as the Interstate Commerce Commission has ruled that Service Order No. 6 does not give the carriers the right to modify mine-rating and car-distribution rules, no assigned cars can be given by virtue of that order for shipment to tidewater.



## Readers' Views and Comments



### W. H. Williams Gives Additional Data on Railroad Situation

[W. H. Williams has written to the editor of *Coal Age* stating that the account of his address at Detroit before the Retail Coal Merchants' Association (*Coal Age*, Vol. 17, No. 25, page 1,244) does not properly record his views on the railroad situation. In order to correct any misconception that may have resulted from the account contained in *Coal Age*, we publish his letter.—EDITOR.]

The 26.9 miles per car per day was made in 1916—the 71 per cent of rated capacity was made in 1919, at a time when the minimum loading requirements of tariffs were suspended.

The low average miles is not due to improper handling by the railroads, but is caused by the fact that shippers have from two to three days to load and an equal amount of time to unload, and Sundays, holidays and rainy days do not count. Additional time is given on tidewater shipments and in other special cases. The result is that a car moves less than three hours out of the twenty-four and in 1919 cars made much less than 26.9 miles per car per day.

Among other provisions which create delay in the handling of cars might be cited "reconsignment" of cars. Under normal conditions it is the practice to forward coal and, to some extent, some perishable traffic and other commodities to large traffic centers for the purpose of reconsignment, and this necessitates the railroads holding a tremendous volume of business, all of which requires track room and cars, and, of course, reduces the average mileage of the cars.

Now that the Railroad Administration has ceased to operate the properties, the tariff provision with reference to minimums will be restored. If we go back to the conditions in 1915 we will secure a loading of only 52 per cent of the rated capacity of cars instead of 71 per cent, as in 1919.

It is not possible at this time to purchase new equipment over night—it will take several months to get the cars built. If, however, the shippers will promptly load and unload existing cars and thereby make it possible to improve the movement, and if they will load them to marked capacity or to the cubical content capacity of the cars, as the case may be, they can thereby create a surplus in excess of 250,000 cars, and this surplus can be created within thirty days.

As I stated at Detroit, I feel the responsibility for the lack of understanding of this subject rests with the railroads rather than the shippers, in that the railroads have not clearly presented to the shippers the aggregate results of their lack of co-operation with the railroads in securing the utmost use of the cars.

In making the suggestion with reference to the 26.9 miles per car per day and the loading of 71 per cent of rated capacity it is not to be understood that these figures are considered as the maximum possible of attainment; they indicate only that which has been accomplished in the past.

It may be interesting to your readers to know that had the railroads of the country secured an average mileage of 26.9 per car per day and a loading of 71 per cent of the rated capacity of cars from 1906 to date, during two years there would have been a surplus in excess of one million cars, during five years there would have been a surplus in excess of nine hundred thousand cars, and in eight consecutive years there would have been a minimum surplus in any one year in excess of six hundred and fifty thousand cars, and in no single year would there have been a surplus of less than two hundred and thirty thousand cars.

The statement further misquotes me with reference to the anthracite situation. The output is fairly satisfactory, but owing to certain limitations on the use of cars some markets have not received the normal supply. This, it is expected, will be corrected as the months go by.

W. H. WILLIAMS,

New York City. Vice-President Hudson Coal Co.

### Produce First—Export Second

The present export coal situation recalls a word of warning which apparently was not heeded as it should have been when issued by the National Committee on European Finance in its report to the Chamber of Commerce of the United States last April. This committee gave full measure of encouragement to the export of raw materials and necessities for industrial rehabilitation abroad, but they warned against excessive exports without adequate expansion of production.

It is vitally essential to the economic readjustment of world affairs that large export of raw materials and fuels be made to Europe in order that the basic activities of the devastated countries be restored. The financial support for foreign business was discussed at length by this committee and it gave the fullest encouragement to the idea that credit to enable export should be made available promptly. Abnormal encouragement of credit, however, did not find favor in the eyes of the committee, for it was clearly recognized that export without corresponding expansion of production within the United States would only add to America's burden in high costs and industrial shortages.

Right now we are seeing the wisdom of this warning. Production, for reasons beyond the control of the coal operator, has been inadequate to meet domestic needs. And yet we have seen a tendency to send abroad all of that coal which could find rail, dock and shipping facilities. Without attempting to appraise the value of the Interstate Commerce Commission limitations upon this business, we must recognize that there has been a certain measure of evil in our export practice. Our bankers saw it some months ago, but the producer, dealer and shipper have been unwilling to place voluntary limitations upon this practice. The inevitable consequence is the restoration of governmental regulation upon this part of the coal trade.

R. S. McBRIDE.

Washington, D. C.



TIPPLE AND RETARDING-CONVEYORS, LOUP CREEK COLLIERY, FAYETTE COUNTY, WEST VIRGINIA

View looking west from the empty tracks above the tipple. On the left over Beard's Fork may be seen the domestic-coal chute. The coal is diverted to the chute from the tipple by opening a door in the conveyor trough and is thus directed back to a wagon road, rapid sliding being restrained by check doors at points in its travel. The narrow valley has room for only a stream and three rail tracks.

## Lowering Lump Coal Down a Steep Mountain On a Moving Bed of Slack

At Beard's Fork May Be Found What Are Probably the Two Longest Retarding Conveyors in the World—The Machines Require Power to Start Them, but One, When Started, Is Self-Actuating and the Other Approaches That Point—They Save the Coal from Breakage and Act as Picking Tables

BY DONALD J. BAKER  
Pittsburgh, Pa.

**A**N INSTALLATION of unusual interest to coal-mining men has recently been completed for the Loup Creek Colliery at its Beard's Fork Mine, in Fayette County, W. Va. It is believed to be the longest

retarding conveyor system in the bituminous coal fields of America, and probably in the world. Two retarding conveyors with a total length of nearly half a mile reach up the steep mountain side from either side of the tipple to the two headhouses located at approximately the elevation of the outcrop of the coal.

One of the most valuable coal deposits in this district, the No. 2 Gas, or Kanawha, bed, has long resisted the efforts of operators who have been successful in profitably mining other beds. They have found this bed peculiarly difficult to develop because the coal is found only near the top of the highest ridges, which are often 600 or 700 ft. above the valley below.

The Loup Creek Colliery Co., one of the pioneer operators in Fayette County, has for several years been successfully working this bed at Page, four miles from Beard's Fork. Here it has utilized monitors for lowering the coal down the steep, wooded slope of the hill.

When the present holdings of this company at Beard's Fork were purchased it was thought by the officials that monitors must be again employed as the transporting medium from the headhouse to the tipple. There were several reasons, however, why the company desired to find some other solution for this transportation problem. Chief among these was the fact that the coal outcropped on opposite hillsides.

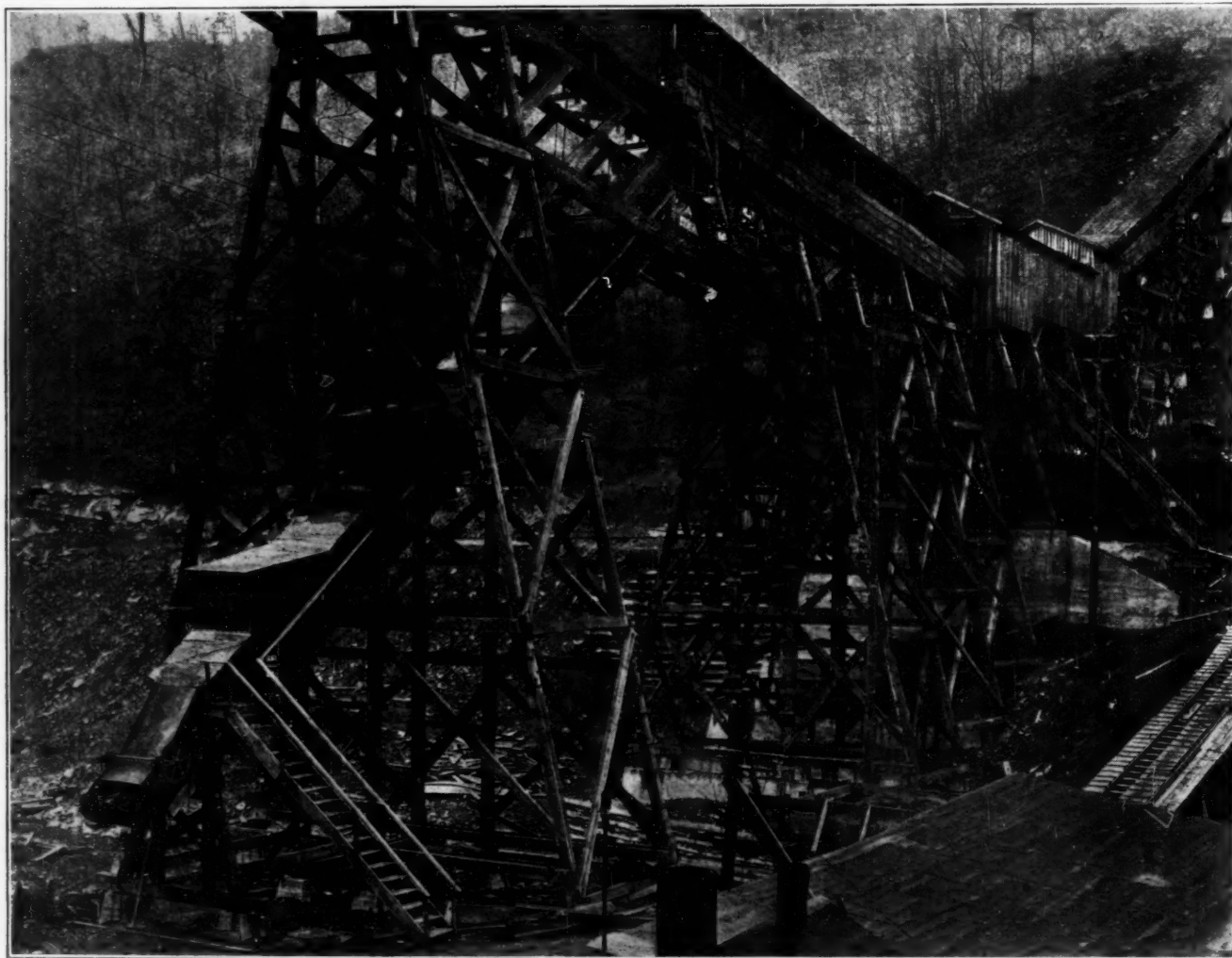
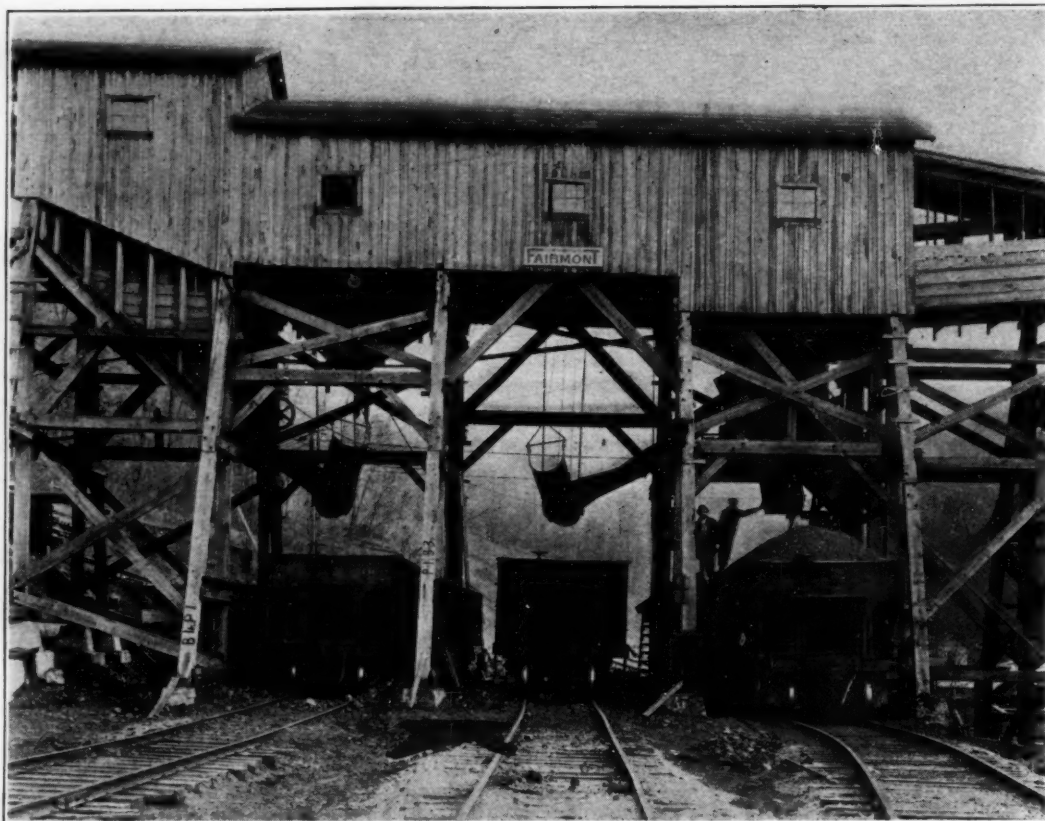


CABLE PASSING OVER A TAIL SPROCKET

Note the long adjustable mounting given the shaft which holds the sheave in place. Extreme temperatures play an important part in the contraction and expansion of the conveyor rope.

### Beard's Fork Tipple

This is really a double tipple, the coal from the left conveyor not mingling with that from the right. The coal from the mine to the left of the double tipple, the north mine, is not screened but sold as run-of-mine. On the other hand the coal from the south tipple is passed over a bar screen by gravity, and two sizes, not always the same sizes, are produced and delivered to the railroad car.



SOUTHERN CONVEYOR TRESTLE WITH FRONT VIEW OF DOMESTIC-COAL CHUTE

On the right can be seen the tipple, the northern conveyor and the supply track. Note the letters marked on the timbers. The timber was framed before it was shipped to the mine and every part was plainly marked for the place which it now occupies. The structure consists of towers and trusses, a good substitute for the trestle when lofty construction is necessary.

If monitors were employed, a double installation would have been necessary, and this would have meant the purchase of a machine for the operation of each of the two planes. This appeared to the management likely to involve a considerable outlay, both for equipment and construction, with the outcome more or less problematical. The company questioned whether the monitor would prove to be the most effective transporting medium.

The monitor or self-acting plane is of course an old and well-established form of retarding conveyor. It is particularly successful where installed for short hauls regardless of the slope over which the car travels. The longer the slope, however, the more ineffective this means of transportation becomes, by reason of the greater amount of time consumed in traveling between the upper and lower termini of the slope—that is, between the headhouse and tippie.

Furthermore, the question of coal breakage, or degradation, may be an important consideration. When employing a monitor it is necessary to dump the coal three times—from the mine car into the storage bin, from the storage bin into the monitor itself and from the monitor into a hopper at the tippie.

At Beard's Fork there was only one place available for the construction of a tippie such as would be suitable for preparing the output from the contemplated openings. It was early perceived therefore that no matter what type of conveyor was installed it would necessarily be a double one. The distance from the foot of the hill to the outcrop line upon either side was more than 1,000 ft.

The topographic conformation of the country consequently strongly influenced the decision for a double tippie. The button type of conveyor was chosen as the one best suited to meet the demands imposed by nature. These naturally limited or made impossible a wide field of selection.

#### SIMPLICITY, SMALL POWER DEMAND, LOW COST

The cable-and-button type of retarding conveyor is well adapted to rough country. It is relatively simple in construction, and the cable when broken can be repaired easily. Furthermore, this type of conveyor is cheaper to install than almost any other system of transportation. In addition to this, on steep grades the power required for operation is practically negligible, for under such conditions it is only necessary to give the cable a start when it is being loaded, and it becomes thereafter self-operating. The three cardinal considerations governing the selection of any conveyor are, therefore, well met in this type. These are simple construction, small power consumption and low first cost.

Consideration of coal breakage, or degradation, in any installation of this kind is by no means negligible. In this particular instance this has been reduced to a minimum through the medium of a distributing plate at the point in the headhouse where the coal is fed to the conveyor. This plate serves two purposes. First, by means of fingers or prongs attached to its end, the coal is distributed over the cable and buttons in such manner that the slack lies at the bottom of the conveyor trough with the lumps resting upon it. This construction prevents the lump coal from coming in contact with, or rubbing against, the sides and bottom of the trough. Second, with the slack thus disposed greater friction is secured between the coal and the trough lining. This acts as a

brake and reduces the tendency of the conveyor to run away when the cable is in motion. It can be readily seen that when the conveyor is installed on a steep slope, with the upper part moving uphill light and the loaded strand coming down, there will be much power generated.

#### TWO INSTALLATIONS ARE ALMOST DUPLICATES

The installations at Beard's Fork are duplicates in almost every particular. The headhouses are situated on opposite hillsides, and are identical in design and construction, the two conveyors being of almost exactly the same length and having approximately an equal slope, while the tippie in the valley handles the output from both mines simultaneously.

Loaded trips coming from the drift mouths upon either hillside are directed into storage yards adjacent to each headhouse. Here they are broken up and the cars fed by hand, one at a time, to a Phillips automatic kickback dump, where the contents of the cars are discharged into an 8-ton hopper. From this point the coal enters an oscillating feeder making seventy-five reciprocations per minute. The eccentric throw may be adjusted so as to impart a 2-, 3-, 4-, 5- or 6-in. movement to the plate. The 6-in. stroke is preferred, since it delivers the coal to the distributing device at the rate of 300 tons per hour.

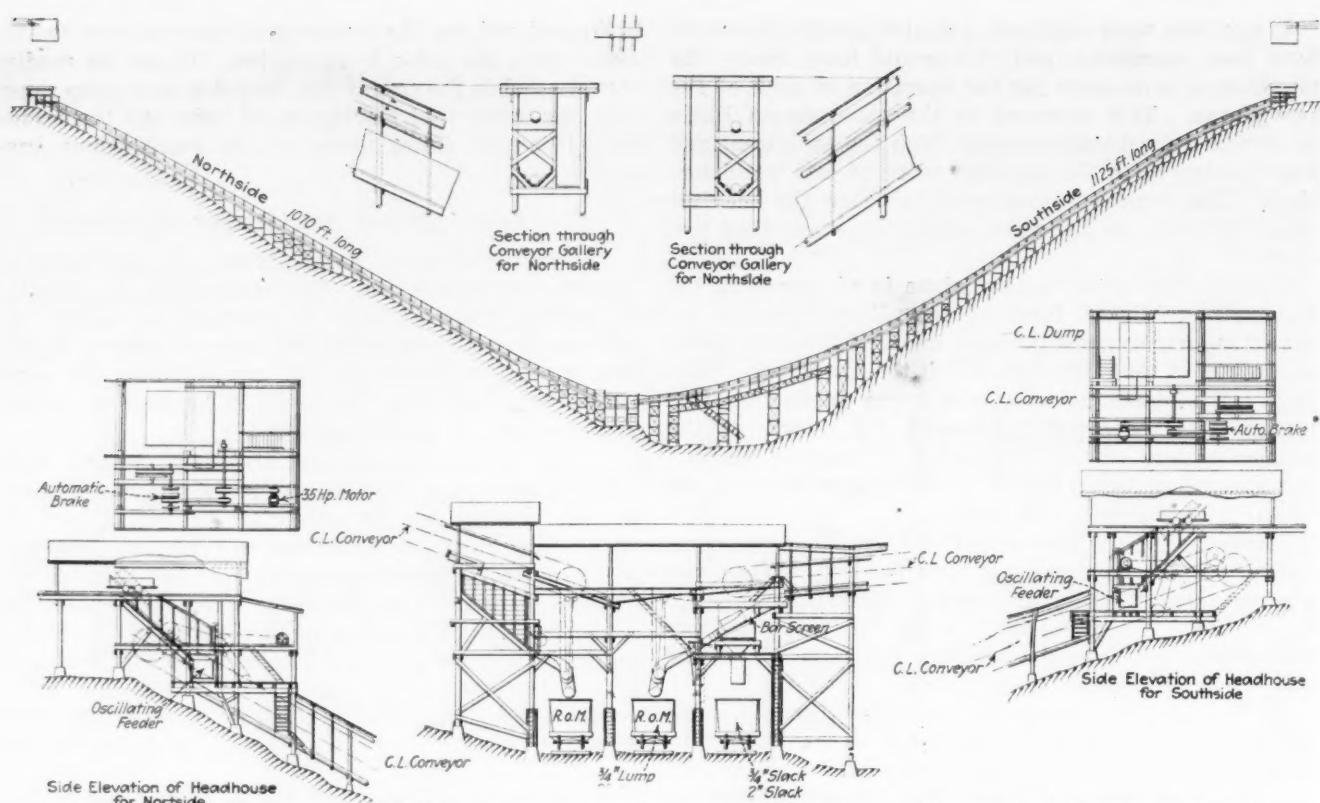
From the feeder the coal passes to the distributing plate, which is so arranged that the material is fed to the cable longitudinally and not at right angles, as is frequently the case. This is to be preferred to the scheme of passing the coal to the cable from the side, as it allows the end of the plate to be fingered so that the coal may be roughly screened into lump and slack, producing the desirable results, already detailed.

The manner in which the coal is distributed on the cable makes it readily possible to pick out the impurities. This operation is performed by men stationed along the side of the conveyor and protected by the shed which covers it. Slate and other undesirable material are removed and thrown into chutes that lead away from the cable to a point on the hillside, where the thickness and density of the shrubbery prevent it from rolling to the bottom of the hill.

Despite the fact that the generation of power has been somewhat curtailed by placing the slack coal in the bottom of the trough, thus giving a greater frictional surface to the load traveling down hill, there is a tendency for the trough contents to run away and carry the cable along with it. This must be checked lest momentum be gained and control lost. The regulation of this energy is secured by an automatic brake that has been installed in connection with the driving gears of the conveyor.

#### ANY TENDENCY TO SPEED PUTS ON BRAKES

The device is a combined belt and brake pulley that is connected to a 35-hp. three-phase 60-cycle motor. This shaft of the pulley is so supported as to permit an oscillatory movement, its maximum traverse being 3 in. The pinion on the first gear reduction is keyed to this shaft and drives the countershaft of the second gear reduction. When the conveyor is generating power the force is transmitted by the gears to the shaft supporting the brakes, and as a result the brake pulley is moved forward and into contact with the brake block, which is asbestos-lined.



DETAILS OF CONVEYOR GALLERIES, HEADHOUSES AND TIPPLE, AND SIDE VIEW OF ENTIRE SYSTEM

The south-side conveyor, having to cross the ravine, needed considerable trestling, and as, for this reason, it is less steep than on the north side it is necessary to

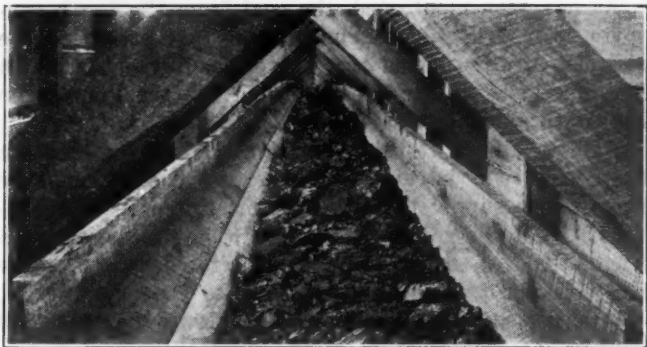
use a little power on it at all times, while the northern conveyor would tend to run away at times if it were not for the restraint of the brake. The south-side head-

house is 12 ft. the higher but the distance from headhouse to tipple is 55 ft. longer. The greater length more than overcomes the increase in fall.



### Northward from Southern Headhouse

Half-way up the north-side conveyor and to the left of it can be seen one of the "picking-table" chutes which carries away the refuse which the pickers extract from the coal as it descends the hill behind the buttons that retard its progress. The rock does not fall to the bottom of the hill, for the brush and small trees prevent it from rolling any distance from the point of deposit. The conveyor is substantially set on concrete posts. Note the supply track to the right of the conveyor.



COAL IN CONVEYOR ON DOWNWARD JOURNEY

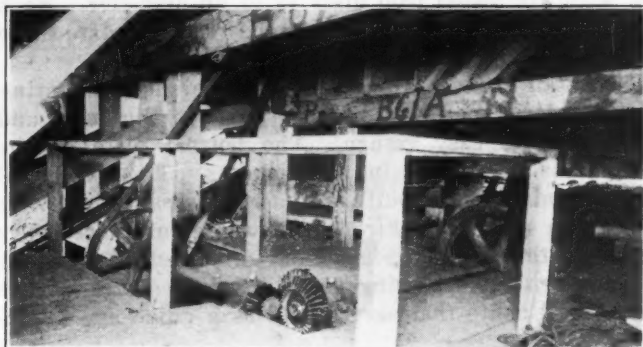
Only the lumps of coal are visible, with three buttons almost entirely hidden by the coal. The slack lies on the bottom and furnishes a larger frictional area and thus aids in retarding the flow of coal, which prevents its degradation.

If the generation of power ceases, and the motor is called upon to deliver energy through the belt, the reaction of the pinion driving the countershaft is immediate, with the result that the gear drives the brake away from the brake block. If the belt should break or the power go off the line, the pull of the conveyor will apply the brake through this same action. Inasmuch as there is no possible way of starting the conveyor under such a condition the brake remains in position against the block and the entire cable is dead.

This safety feature merits more than passing attention. The conveyor when loaded holds about fifty tons of coal. Should this ever get beyond control, it would rapidly gain momentum in moving down the hillside and cause great damage through piling up at the bottom. It is more than possible that some men on the tippie might lose their lives should this occur, for the men there employed would have scant time to realize their danger and seek safer quarters.

The brake shaft upon either conveyor has a continuous oscillation caused by the ever-changing loads on the cable and the resultant application and release of the brake to and from the brake-block. This type of brake has proved highly effective both here and elsewhere, and is beyond doubt a detail tending toward safety.

All the mechanism in the headhouse is driven by countershafts from the 35-hp. motor operating the conveyor. Approximately 20 hp. is required to put the conveyor in motion from rest. This motor is started by a man stationed at the headhouse, although it may be stopped



ARRANGEMENT OF COUNTERSHAFT AND GEARS

These moving parts operate the brake eccentric. A rough fence surrounds them and so makes accidents less likely, while leaving the machinery readily accessible for oiling. The brake would act if the power were to fail or the belt were to be displaced.

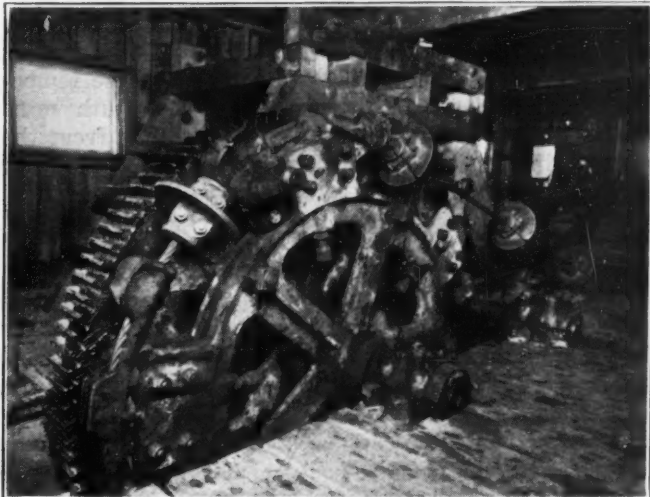
instantly by the men on the tippie. To start it again a signal is given from the men below.

The conveyor on the north side of the property is 1,070 ft. long, while the rise is 458 feet. This gives it practically a 29-deg. pitch, which is constant from the headhouse to the tippie. On the south side the conveyor is 1,125 ft. long and the rise is 470 feet. This conveyor has three distinct slopes. The section leading away from the headhouse is on a pitch of 19 deg., the middle section has an inclination of 33 deg., while at the bottom the pitch flattens out until a 5-deg. slope is attained.

This is the inclination at which the conveyor enters the tippie. The south conveyor is thus on a reverse curve, which is, perhaps, the ideal arrangement. While much power is generated on the steep incline, this is almost entirely absorbed on the nearly level section at the bottom. A brake is provided in the headhouse on the south hill for this conveyor, but it is practically never operative, serving merely as a safety factor. While power is required to operate this conveyor at all times, the amount needed is small. Both conveyors have a speed of 90 ft. per min.

#### TAIL SHEAVES ONLY MAINTAIN ALIGNMENT

As may be noted from the accompanying illustrations, the troughs, which are of wooden construction, are supported for most of their length upon trestles. The trestle framework also is of wood, while the supporting tower legs are set on solid concrete bases. Both cables are 1½ in. in diameter, and to them at intervals



TWO VIEWS OF THE HEAD SHEAVE AND ENCLOSED BRAKE BLOCK

The large gear reduction of the left illustration drives a shaft that operates the eccentric for the oscillating feeder. In the rear of the room in both illustrations can be seen the motor which is connected by a belt to a flywheel and drives the entire mechanism.

of 4 ft. are bolted iron discs 12 in. in diameter. Each head sheave has five pockets and may accommodate three buttons at one time.

The tail sheaves are given a simple shaft mounting as they serve merely to keep the cable in alignment and facilitate an easy return. The bottom plate of the trough is of steel,  $\frac{1}{4}$  in. in thickness. This is curved to the radius of the buttons so as to give a contact with them for about one-third of their circumference. The sides of the trough are made of  $\frac{1}{8}$ -in. steel plates, while the return cable passing above the loaded strand runs in a steel chute that serves both as a guide and a support.

Parallel to and alongside of each conveyor is a narrow-gage track, by means of which cars containing supplies and materials for use in and around the mines and in the surface buildings at the outcrop may be transported up the hillside by means of a small steam-driven hoisting engine, situated at the bottom. The efficient handling of materials and supplies at such mines as this is a difficult problem. When it is considered that all supplies must be elevated through a vertical distance of 400 ft. the magnitude of this problem can be appreciated.

#### GRAVITY DOES ALMOST ALL THE WORK

The double tippie, which, like other units of this plant, is constructed of wood, is equipped for handling and preparing the output from both conveyors. Considering the amount of mechanical equipment installed at this operation, the power consumption is perhaps less than at any other plant of similar capacity in the country. Not only is the conveying system practically self-propelled by reason of the steepness of its pitch, but gravity also plays an important part in the preparation of the coal on the tippie. Outside of the two tail sprockets for the conveyors everything in the building is operated either by gravity or by hand.

Each tail sprocket has been given a long take-up in the tippie. Considering the fact that each cable, including both upper and lower strands, is over 2,000 ft. long, it is readily apparent that changes in temperature will make a marked difference in its length. In order that these steel ropes may be kept in proper tension the tail shafts are so mounted that the cables may be tightened in warm and loosened in cold weather. This arrangement prevents an excessive amount of play or lost motion that might otherwise develop and handicap steady production.

The coal on each conveyor is delivered to hoppers upon either side of the tippie. An undercut gate on the south side of the building and a roller-supported sliding gate upon the north side control the outlet of these temporary reservoirs. The product from the south mine passes over a gravity bar screen, while that from the north mine is loaded only as run-of-mine. The bar screens are fitted in such a way that either  $\frac{3}{4}$ - or 2-in. spacing may be used.

#### ADJUSTABLE LOADING CHUTES SAVE BREAKAGE

The slack passes directly into a hopper, from which it goes, by way of a rectangular chute, to the railroad car beneath. Lump sizes coming from the screen descend through a curved loading chute which is fitted with an extension. These lump sizes may be loaded separately and dropped into the cars without appreciable breakage, as the extensions of the loading chute are counterbalanced and controlled by the trimmers through geared hand crabs.

As has been mentioned, the coal from the north conveyor is loaded only as run-of-mine. It passes to the railroad cars by means of a curved loading chute which is a duplicate of the one employed for the lump from the south side.

As the miners at this operation all live in the town nearby, it will be evident that some means must be provided to supply them with domestic coal. The conveyor from the mine on the south hill passes over a wagon road in the hollow. At a suitable point a chute has been built from this conveyor to the wagon road, so that a portion of the coal coming down the south hill may be directed away from the tippie. This is accomplished by the simple means of providing a door in the conveyor trough.

#### DOMESTIC COAL CHUTE HAS CHECK GATES

Since the domestic coal chute is about 100 ft. long and constructed on a slope of 35 deg. it would be inadvisable to allow coal to rush down it, gathering momentum as it traveled, lest the gate at the bottom be torn loose from its support through the impact. Check-gates are therefore installed in this chute. These are hinged from the top and counterbalanced so as to retard the rapid movement of the coal down the chute. At the lower end of the chute an undercut gate permits of the transfer of the coal into wagons. This is regulated by a chain passing over a 30-in. chair wheel.

As may be seen from the foregoing description, this whole installation, which was built by the Fairmont Mining Machine Co., is strikingly simple yet highly effective. Although power is employed to put the conveyors in motion, once they are started they are practically self-propelling and the only energy required to keep the coal moving is that furnished by nature, namely, gravity. This holds true not only down the steep mountain side but through the tippie as well.

### Presence of Gold and Silver in Refuse Products from Coal Washeries

**I**N studying the question of the value and possible utilization of the refuse or tailings from bituminous-coal washeries the presence of gold and silver was given consideration, prompted by the fact that certain coals in Wyoming have carried those metals and that traces of both have been found in the coke produced from these coals.

The why and the wherefore of the occurrence of gold in coals from this district has never been determined. The most plausible explanation seems to be that the sands which submerged the swamps during the geological period in which the coal was formed, which sands, transformed into sandstone, now form the roof of the coal, were derived in part from old gold-bearing alluvium. While the sand was being deposited the gold may have worked down into the underlying body and, in any event, gold is now found in the coal.

A preliminary study of this possible occurrence was conducted on refuse from coal washeries in the southern Illinois coal fields. A representative sample of washery tailings analyzing 40 per cent ash and 7 per cent sulphur when assayed by the standard fire method was found to contain a trace of gold and nine-tenths of one ounce of silver per 2,000 lb. of refuse. The cost of extraction and other economic features were not considered, as the investigation was confined to theoretical possibilities.

# How to Operate Combination Storage Battery and Trolley Locomotives\*

Practical Instructions for Motormen, Repairmen, Superintendents and Foremen Which Will Enable Them to Keep Their Equipment Continuously in Running Order—Use of Constant Current and Constant Potential in Charging

BY JOHN B. HICKS†  
Jenkins, Ky.

**A**T THE Elkhorn Mines of the Consolidation Coal Co. the instructions given the motormen on the handling of combination storage-battery and trolley locomotives are as follows, it being assumed that the batteries are fully charged when locomotives are taken out of the motor barn at the beginning of the shift:

(1) Open the main battery switch on the locomotive. (This is to prevent a short circuit in the battery should the metal covers accidentally come in contact with the inter-cell connections and the frame of the locomotive.)

(2) Place the asbestos-board covers over the battery compartments, place the metal covers on the locomotives and close the main battery switch. (The locomotive is now ready for operation.)

(3) Do not charge the battery until the indicating hand on the ampere-hour meter has passed the gassing point. After this the shunt trip circuit breaker in the charging circuit may be closed and the battery charged at will.

(4) Do not meddle with the shunt trip breaker in the discharge circuit. (When the indicating hand on the ampere-hour meter makes contact at the maximum discharge point the shunt trip circuit breaker opens in the battery discharge circuit. This has already been described in the article entitled "Changes That Experience Has Dictated in Details of Combination Locomotives.")

At the end of the shift the motorman delivers his locomotive to the motor barn. Here he is instructed as follows:

(1) Open the main battery switch on the locomotive. (This prevents a short circuit in case the metal covers accidentally come in contact with the inter-cell connectors of the battery and the side frames of the locomotive.)

(2) Remove the metal covers from the top of the locomotive and the asbestos-board covers from the battery compartments.

(3) Report to the electrician for the purpose of recording the number of cars of coal and slate pulled, and

any trouble experienced with the battery or locomotive, also any delays such as waiting on empties, waiting on charge, off track or hauling supplies.

The instructions which we have issued to repairmen who have been given charge of motor barns where combination locomotives are cared for are as follows:

(1) At the end of each shift inspect the battery to see if the electrolyte is at the proper height in all cells. If found low the battery must be flushed. (This means pure distilled water is added until the electrolyte reaches the proper level. A battery may need flushing once, twice or three times a week, depending on the amount of work done.)

(2) Replace any cracked covers or jars, repair any leaky sealing, and examine any cells which show signs of trouble.

(3) Take the gravity reading of the pilot cell daily, comparing it with the ampere-hour meter reading. (This is done to keep check on the battery and to keep the ampere-hour meter and battery in step.)

(4) See if the motorman has turned the indicating hand on the ampere-hour meter by tampering with the reset. (This meddling with the ampere-hour meter was easily done on the locomotives first installed, but in their later designs the meter manufacturers have overcome this feature.)

(5) Put the battery on charge and so leave it until fully charged, at which time contact is made within the meters, thus stopping the charge.

(6) Do not allow a locomotive to leave the motor barn with a jumper in the boosting resistance. Take a locomotive out of service whenever its boosting resistance is broken or otherwise damaged, and do not operate it again until this resistance can be replaced or repaired. (This is necessary to protect the battery from too high a rate of charge. It must be kept in mind that the boosting resistance is a fixed resistance of proper capacity which is in series with the battery while it is being charged from the trolley.)

(7) Never add acid to a cell in the battery without first ascertaining the cause of the low gravity. (As only the water evaporates from the electrolyte, there is no loss of acid during charge or discharge. The only causes of loss of acid are spilling, excessive flushing when adding water, leaking through cracked jars or covers, or through a defective seal. If the repairman finds that the electrolyte has been lost for any reason,

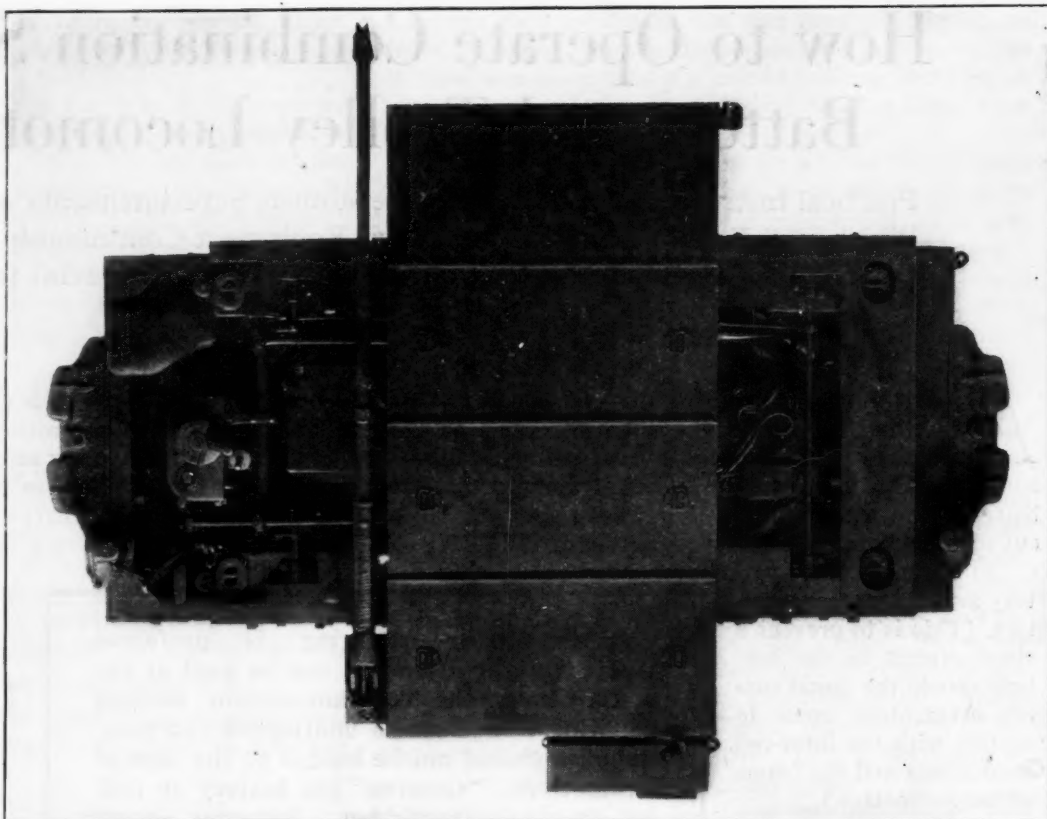
**Constant-voltage charging is preferred where a night attendant can be kept at the motor barn, the constant-current method adapting itself best to unattended charging. Supplies should not be hauled on the tops of locomotives. "Goosing" the battery or trolley should be forbidden. Batteries should not be flushed with water that has been left in any metallic vessel except one of lead.**

\*Second installment of an article entitled, "Use of Combination Battery and Trolley Mine Locomotives," read before the Kentucky Mining Institute at Lexington, Ky., June 4, 1920. Prior installment, entitled "Changes That Experience Has Dictated in Details of Combination Locomotives," appeared in the issue of July 1. Illustrations supplied by courtesy of Jeffrey Manufacturing Co.

†Assistant superintendent, power and mechanical department, Consolidation Coal Co.

### Top View With Storage Battery Swung Over

This illustration gives an excellent idea of how easily access may be gained to all electrical parts of the machine. It will be noted that the sand-box lids are never covered by the battery compartment.

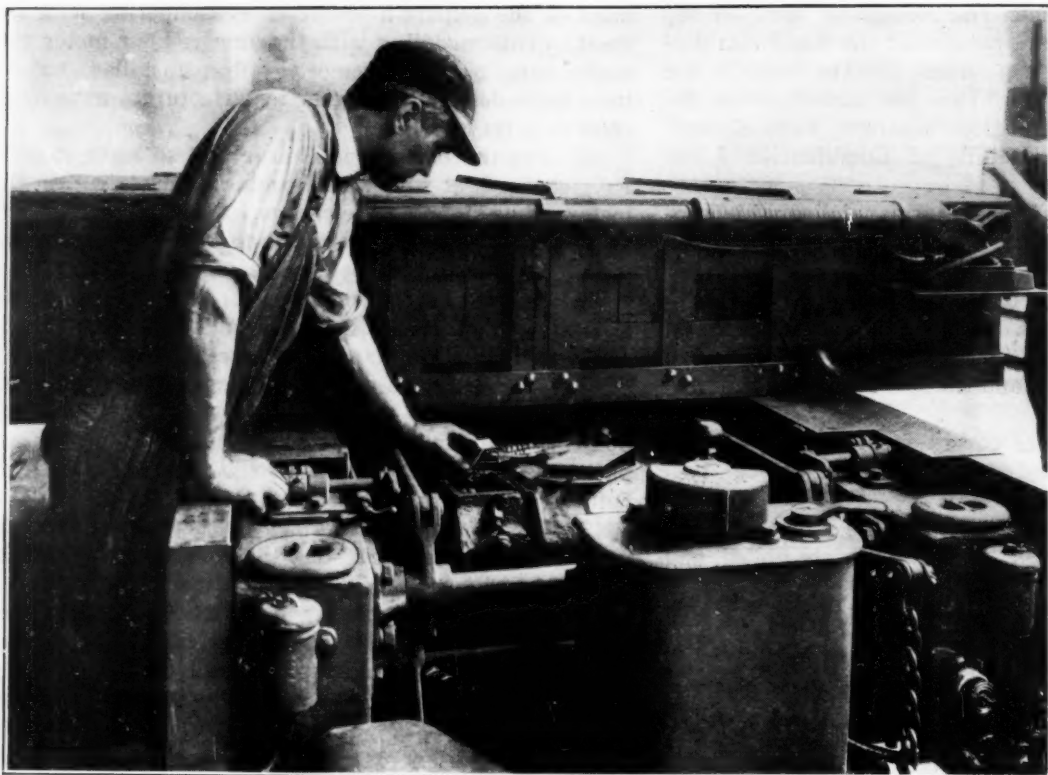


the cells in trouble are refilled with electrolyte of about the same specific gravity as that in the surrounding cells.)

(8) Never flush a battery with distilled water which has been placed or stored in a metallic vessel of any kind (lead excepted) and always keep the vessel clean and covered and so exclude all impurities. Glass, earthenware, rubber or wooden receptacles which have been thoroughly cleaned are permissible.

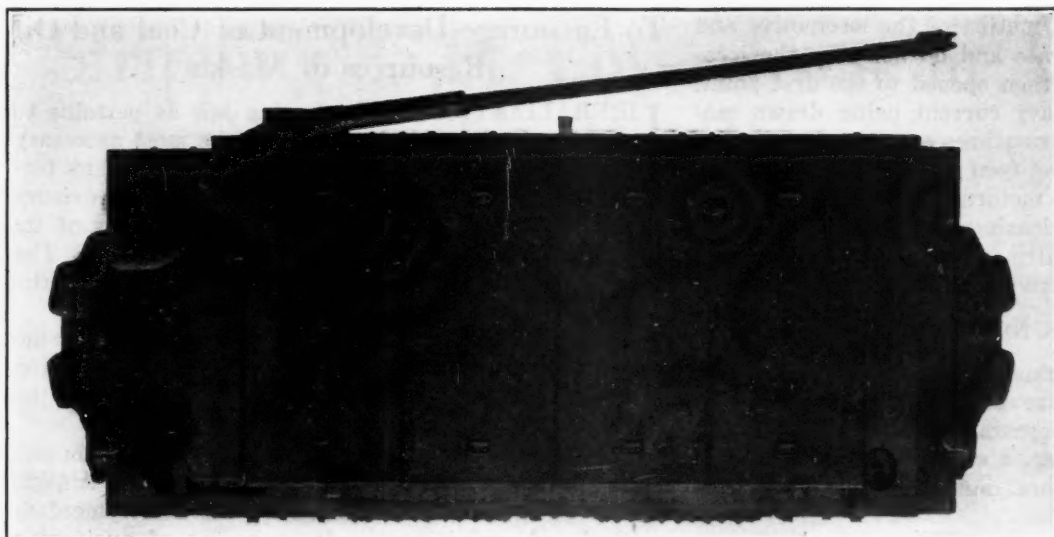
(9) Give an equalizing charge once each week. To do this place the battery on charge in the regular way and

when the indicating hand on the meter reaches the zero contact turn the indicator back about 25 per cent of the capacity of the battery in ampere-hours and continue the charge (disregarding the ampere-hour meter) at approximately one-half the finishing rate until the maximum specific gravity of the electrolyte is reached. This is determined by taking the gravity reading of one or more pilot cells every half hour until there is no further rise in gravity. The indicating hand of the ampere-hour meter is then placed at zero, showing that the battery is fully charged. The meter and battery are



### Renewing a Brush

When the battery container is lifted slightly and is swung crosswise of the machine practically all of the electrical parts are accessible.



### Top View of Combination Locomotive

Removal of the four cover plates shown gives ready access to the battery for inspection, repair or the addition of distilled water to the electrolyte.

now said to be in step. Full directions for giving the equalizing charge are given in the battery manufacturer's instruction book. Every man who has charge of batteries should have one of these books.

(10) During a slack run at the mines, keep the batteries properly flushed, charged and clean at all times.

(11) Do not leave a locomotive standing out in the hot sun with the covers over the batteries removed. (The heat from the sun will soften the covers and top edges of the jars. These will harden again as soon as taken in out of the sun. The heat of the sun also causes the sealing compound to run, possibly causing the sealing to become leaky. This is highly objectionable.)

(12) In cold weather, after flushing a battery, put it on charge immediately. (This will cause the water and electrolyte to become thoroughly mixed, thus preventing the water from freezing. In cold weather a battery in a discharged condition must not be left standing out exposed, as the specific gravity of the electrolyte is low and it will freeze at about 28 deg. F. above zero. See battery-manufacturer's instruction book for complete instructions.)

(13) Once a week wash the tops of the batteries with a soda solution and wash the solution off by turning a

hose on the whole battery while still in the locomotive. (This neutralizes any acid that may be on the tops of the trays and battery, keeping them clean and in good condition. It also washes away any dirt that might be in the battery compartments. The battery compartments in the locomotives here described are so designed that it is possible to wash the batteries without getting any water on the electrical equipment.) Before washing the battery, as above stated, ascertain that all plugs are in place and that there are no broken or leaky covers in the battery. (By preventing the trays from becoming acid-soaked they last as long as the battery. To clean the battery in this manner does not require more than about fifteen minutes and about two cents' worth of soda and sufficient water for washing.)

(14) Report any unnecessary abuse of the storage battery or locomotive to the mine foreman and superintendent.

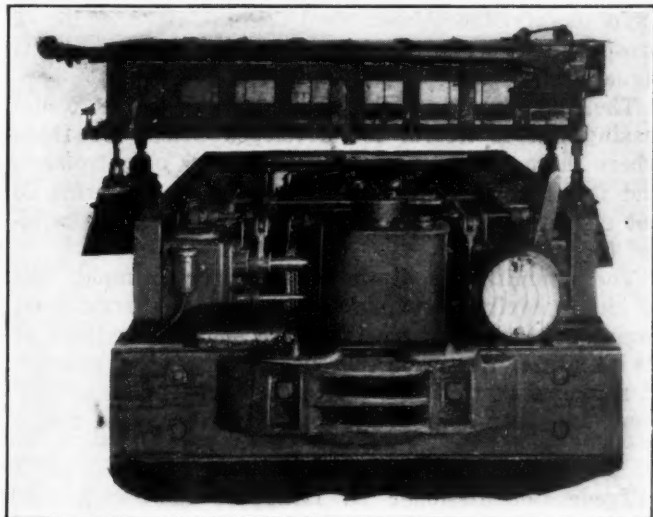
(15) Properly instruct all motormen in the care of the battery, that is as to its charging and discharging, also in the care of the locomotive.

The operating instructions to superintendents, mine foremen and assistant foremen in charge of the mines where the combination locomotives are used are the same as to the motormen, but they emphasize the importance of the fact that the batteries must be charged and discharged in strict accordance with instructions. These officials are also given the following instructions:

(1) Do not permit motormen to haul supplies on the tops of locomotives. (This is necessary because it will prevent metal covers from being mashed down into the top of the battery. It also prevents nails, track spikes or any other metal conductors from working down between the metal and asbestos-board covers to the top of the battery. These pieces of metal coming in contact with the inter-cell connectors might cause a short circuit on one or more of the cells, or they might form contact between these connectors and the frame of the locomotive, making a heavy short circuit. In either case an explosion might occur in the battery and by blowing the covers out, breaking them and cracking the jars, do much damage to the locomotive.)

(2) Do not permit "goosing" the battery or trolley. (To express this in common English: Do not change the reverse cylinder to the position opposite to that of the direction of motion of the locomotive, before the machine is stopped by the brakes.)

If the reverse cylinder position is changed to that op-



END VIEW WITH STORAGE BATTERY LIFTED AND SWUNG TO TRANSVERSE POSITION

This illustration shows the ease with which the battery compartment may be moved as a unit. The trolley pole, of course, is attached to the battery container.

posite to the direction of motion of the locomotive and the motors fail to generate and do not stop the locomotive, the controller is then opened to the first point. This will result in a heavy current being drawn momentarily through the armature, causing unnecessary heating and burning between the commutator and brushes. The reason the motormen "goose" the motors is to avoid setting and releasing the brake.

(3) Report to the repairman at once any unsatisfactory service or trouble with the battery or locomotive.

#### ELKHORN MINES UTILIZE BOTH METHODS

At present both the constant-potential and the constant-current methods are employed at the Elkhorn mines in charging. The constant-voltage method is followed at those mines where a sufficient number of locomotives are installed to warrant the employment of a night attendant.

The charging apparatus for the constant-voltage system consists of a motor-generator set of sufficient capacity to give the charge properly, a switchboard, including a machine-control panel with an overload circuit breaker and the necessary switches and instruments. The charging panels are of the unit type, each panel being equipped with one double-pole single-throw knife switch, one ammeter switch and one fuse.

There also is an instrument panel unit type equipped with a voltmeter and ammeter so arranged as to read any circuit desired. The charge is given to the battery with constant bus potential of about 2.3 volts per cell. A battery in any state of discharge can be put on charge and in a short time will receive a large portion of the energy it lost in its discharge. The current automatically tapers from a high rate at the start to a low rate toward the finish, and no attention or adjustment is required.

When the indicating hand returns to zero, contact is made within the meter. This opens the shunt trip breaker in the charging circuit, thus stopping the charge. Where it is necessary to have the battery charged quickly the constant-potential method should be used.

#### CONSTANT CURRENT NEEDS NO NIGHT ATTENDANT

In motor barns where no night attendant is employed the constant-current method is employed. The batteries are given the entire charge at the finishing rate, through an external fixed resistance. When the battery is fully charged contact is made within the meter, which causes the shunt trip breaker in the charging circuit to open, thus stopping the charge. This particular method of employing constant current can be used only where there is ample time for the charge. There are several constant-current charging equipments manufactured any of which automatically cut in resistance during the charge.

The batteries while being charged by this method (constant-current) are prevented from discharging back to the line by an automatic reclosing switch. This switch is installed between the line and the battery. When the power goes off the switch opens, while as soon as the power comes on it closes. It has been found that this system of charging works satisfactorily, for there usually is sufficient time in which to charge the batteries. The method of charging to be used must be chosen for each installation according to its merits and cost.

## To Encourage Development of Coal and Oil Resources of Alaska

**L**IBERALIZATION of the leasing law as pertains to coal and oil in Alaska is one of the most necessary requirements looking to the development of that territory. This is the finding of the Alaska Advisory Committee, which has just reported the results of its investigations to the Secretary of the Interior. The recommendations of the committee pertaining to the mining industry are as follows:

That the Bureau of Mines make a report of the feasibility of smelting Alaska copper ores within the territory, this work to be done in co-operation with the Geological Survey so far as may be necessary.

That the Bureau of Mines make an investigation and report on methods and costs of placer mining in Alaska, this to be specially directed toward the development of methods of exploiting the large bodies of auriferous gravels of low gold content.

The committee finds that the development of coal and oil fields is of first importance to the territory. It therefore recommends that:

Every encouragement be given to coal and oil development, especially by making the terms of leases as liberal as the law allows.

The necessary underground explorations in the Matanuska coal field be prosecuted with vigor by the Government.

The companies engaged in prospecting the Bering River coal field be given every encouragement to develop coal and to build railroads necessary to its marketing.

The Inter-Departmental Committee give immediate and earnest consideration to the desirability of the establishment of a coaling station for commercial and naval uses at a port in the Aleutian Islands most suitably located to serve trans-Pacific shipping and, if possible, the cannery industry of southwestern Alaska.

The committee furthermore recommends that Congress be asked:

To increase the appropriation for the investigation of the mineral resources of Alaska as being one of the most important steps to further mining development in the territory and the development of tonnage for the railroad.

To modify the Alaska coal-leasing law allowing a prospecting period of four years before a lease is signed.

The committee finds that while the Alaska petroleum leasing law is liberal for developed fields, for those where there are some surface indications of petroleum, and for those that are readily accessible, its terms do not encourage the search for oil in inaccessible wild-cat territory.

The committee is of the opinion, for example, that to induce capital to explore for oil in the Arctic coast region of Alaska, where there are some indications of its presence, a more generous law must be enacted. It recommends that this matter be taken under advisement and that appropriate legislation be asked for.

Trade Commissioner H. Lawrence Groves, Zurich, Switzerland, reports that satisfactory arrangements have been concluded whereby American coal destined for Switzerland will be received at the Italian port of Savone, for transportation into Switzerland by rail over the Loetschberg or the Gothard lines.

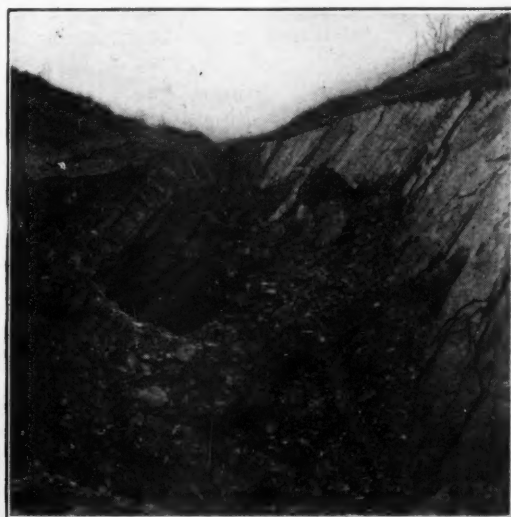
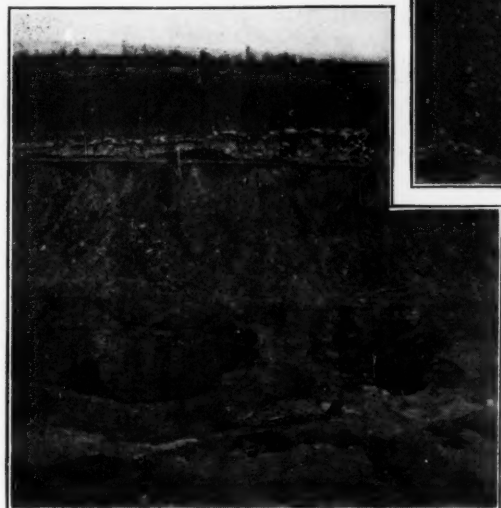
# Stripping 85-Ft. Cover from an Anthracite Bed with a Dragline Excavator

A Large Tonnage Will Be Mined on the Surface and Passed Down Battery Breasts, Which Will Be Driven Upward from the Mine Below—  
The Coal Is To Be Hauled Underground to a Breaker for Preparation

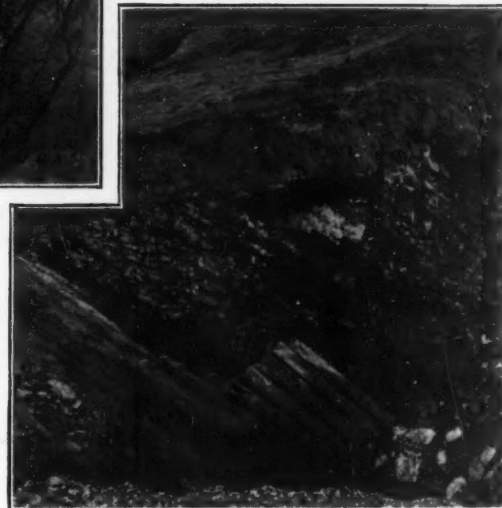
ONE of the most interesting stripping operations now being undertaken in the anthracite region of Pennsylvania is that of the Lehigh Coal & Navigation Co. near Nesquehoning. It is the intention of this firm to uncover a large area of the Mammoth Bed, which in this vicinity is as much as 230 ft. wide

other is a 150-hp. machine and is used to rotate the excavator. Both of these motors are Westinghouse machines of the slip-ring type. Power for the operation of the excavator is furnished by a high-tension line of the Lehigh Coal & Navigation Co. Energy thus reaches the plant at 11,000 volts, 60 cycles, 3 phase

Top of Breast  
With Timbers  
in the Manway



Breaking into  
the Workings  
Excavated Below



Drawing Out  
the Pillars  
From the Top  
Down

on the top and tapers down to practically a point at the bottom. The coal deposit is here overlaid with an overburden reaching a maximum of 85 ft. This cover consists mainly of gravel and clay and contains a few boulders, but no stratified rock. A cross-section of the bed at a point where the stripping is being made is shown in one of the accompanying illustrations.

It is known that, from the point where the cross-section illustrated was taken, the coal extends for a distance of 1,400 ft. toward the city of Mauch Chunk and probably somewhat further. The maximum width of the cut at the bottom is 230 ft. while at the top it will measure 430 ft. In order to strip the overburden the company has purchased and installed a No. 175-B Bucyrus dragline excavator.

This machine is operated electrically, two motors being required for this purpose. One of these is of 250 hp. and is used to operate the hoist line, while the

and is stepped down to 440 volts before going to the machine. The transformers employed are mounted on trucks, permitting their movement from place to place as the stripping proceeds. They are protected upon either side by fuses.

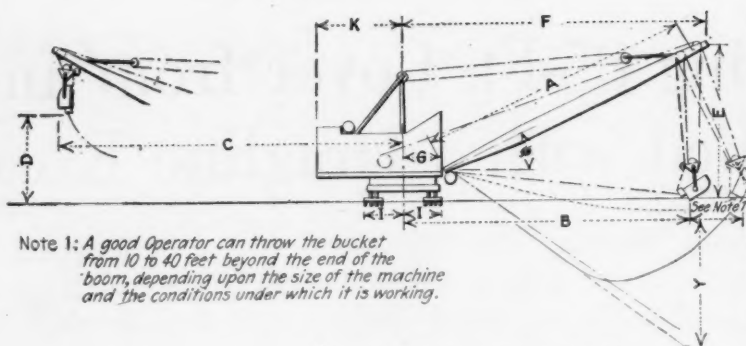
While the clutches on the excavator are air-controlled, the brakes are hand-operated. The boom is 128 ft. long, while the distance from its attachment to the excavator to the center of the machine is 13 ft. The total reach of the machine, taking into account the angle at which the boom is set, is about 130 ft., while a good operator can swing the bucket 40 ft. more, making an absolute maximum reach of 170 ft.

A 3½-cu.yd. bucket is at present employed on the excavator. The depth of the cut at which this machine is now working is 85 ft. This is believed to be the greatest depth for a single cut upon which any machine of this type has ever been employed.

A dragline excavator of this type is hard on ropes, therefore a few figures covering the life of such members may be of interest. The greatest wear comes upon the hoisting rope, which in this machine is of  $\frac{1}{4}$ -in. diameter. It is a Lang lay cable composed of 6 strands of 19 plough-steel wires each and has a length of 660 ft. The longest life of this rope yet secured upon this particular machine has been 52 days, while the shortest life noted has been 4 days.

The ordinary or average life of a hoisting rope is approximately 30 days, this being as much as can reasonably be expected. At the present time a Waterbury rope is being used on this machine. It is a peculiar coincidence that the make of rope which gave the longest life as stated above also gave the shortest.

Next to the hoisting rope the dragline receives the



Note 1: A good Operator can throw the bucket from 10 to 40 feet beyond the end of the boom, depending upon the size of the machine and the conditions under which it is working.

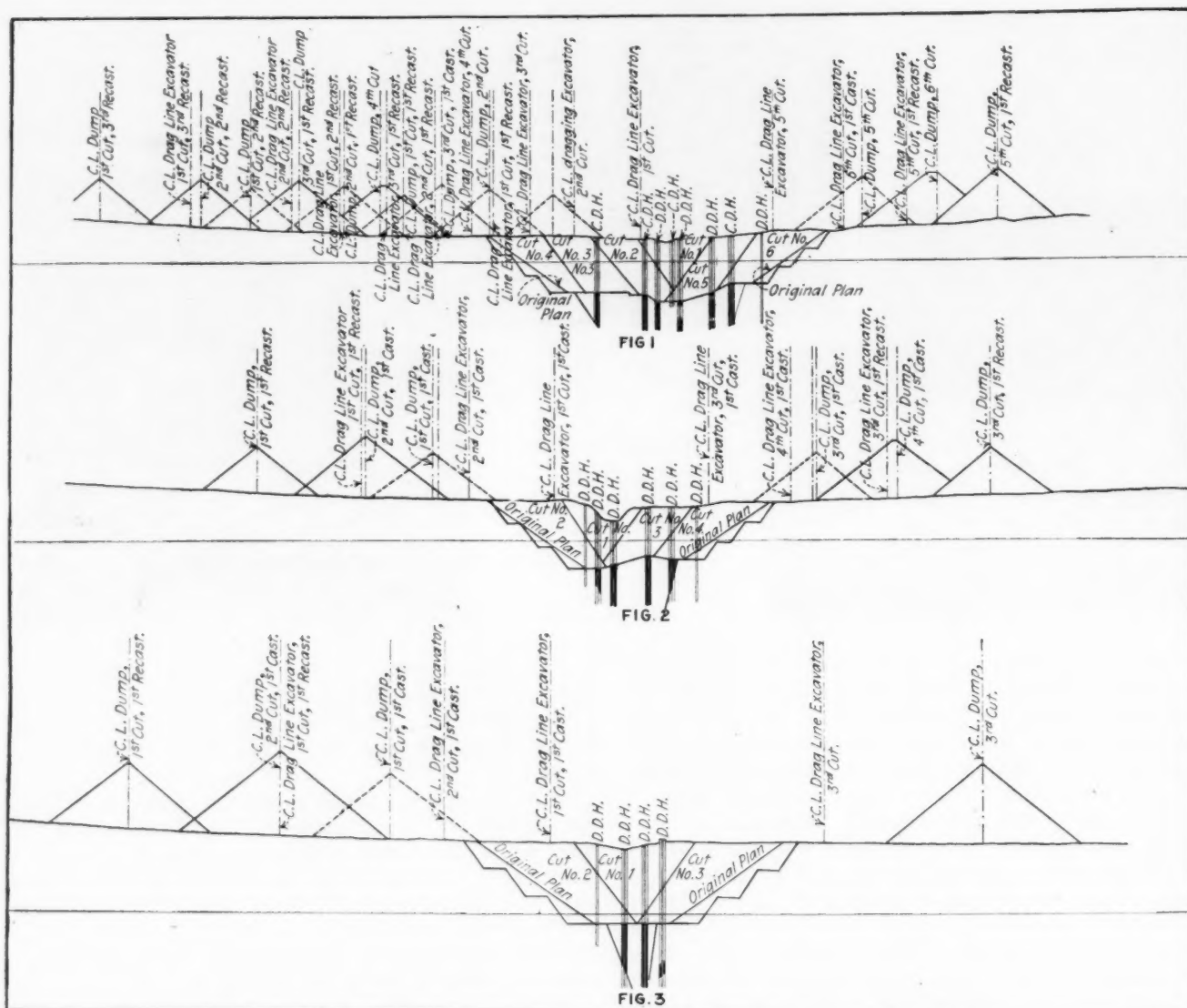
| Class 175                       |                  |
|---------------------------------|------------------|
| 125 ft. Boom                    |                  |
| 3½ cu. yd. Bucket               |                  |
| A                               | Angle of Boom    |
| B                               | 25°              |
| C                               | 40°              |
| D                               | 125'-3"          |
| E                               | 109'-0"          |
| F                               | 129'-9"          |
| G                               | 113'-8"          |
| H                               | 40'-4"           |
| I                               | 67'-4"           |
| J                               | 62'-0"           |
| K                               | 90'-4"           |
| L                               | 130'-2"          |
| M                               | 113'-0"          |
| N                               | 12'-10"          |
| O                               | 12'-10"          |
| P                               | 13'-10"          |
| Q                               | 12'-10"          |
| R                               | 27'-2"           |
| S                               | 27'-2"           |
| T                               | 45'-0" to 50'-0" |
| U                               | 69'-0" to 43'-0" |
| Option-<br>al<br>Equip-<br>ment |                  |
| 90 ft. Boom                     |                  |
| 6 cu. yd. Bucket                |                  |
| 100 ft. Boom                    |                  |
| 5 cu. yd. Bucket                |                  |

#### DRAGLINE EXCAVATOR

All the dimensions being carefully worked out, it is readily possible to ascertain what will be the length of the cast under any given condition. Every item of the excavation is plotted out beforehand so as to define the amount of casting and recasting necessary in performing any given part of the work. There are more considerations necessary than with shallower excavations.

greatest wear, and a life of approximately 30 days is all that this rope can be expected to have. The diameter of this rope is  $1\frac{1}{2}$  in. and its length 200 ft. At present a Roebling rope is employed as dragline.

Two other ropes are employed, one of which is the dump line and the other the boom extension rope or topping lift. An old hoisting rope is used for dumping

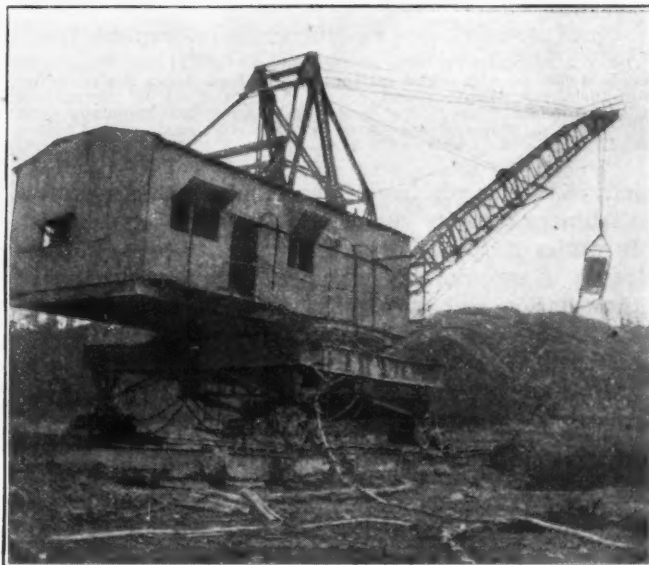


#### OPERATIONS OF DRAGLINE EXCAVATOR AS PLANNED FOR WIDE, LESS WIDE AND NARROW CUTS

In Fig. 1 the excavator will make no less than six cuts and will recast the first cut three times, the second cut twice, the third and fifth cuts once, while the fourth and

sixth cuts will be handled but once. In Fig. 2 there are but four cuts and only the first and third cuts are recast and they are recast only once. In Fig. 3, owing to the

narrowness of the cut, only the first cut is recast. The difficulties arise as much from the width as from the depth. The wider the cut the more recasting necessary.



DRAGLINE EXCAVATOR PREPARING TO DIG, DIGGING, TRANSFERRING MATERIAL AND UNLOADING

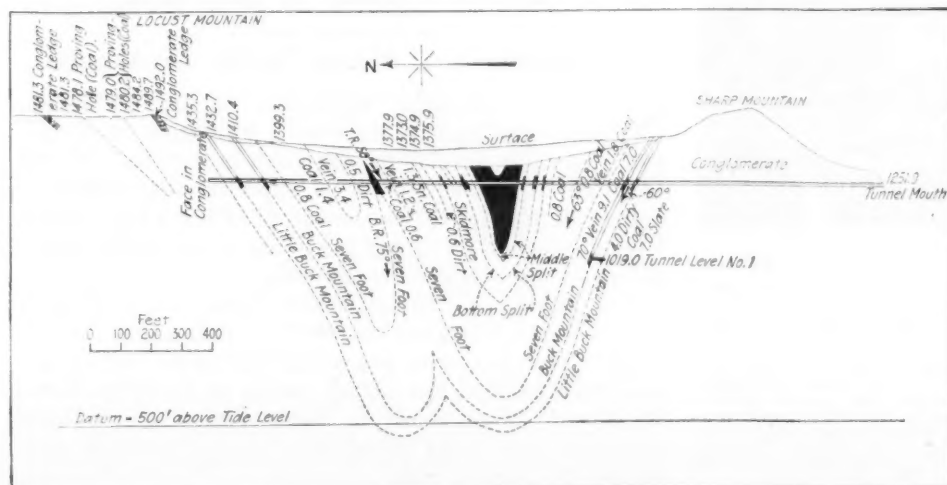
Upper left illustration shows the 125-ft. boom engaged in loading at a point quite near the base of the excavator; upper right, the 3½-cu.yd. scraper with its strong steel teeth just beginning to dig in at a

point still not near its further reach; lower left, the scraper lifted a few feet from the ground, and lower right, the excavator revolved and starting to dump its load on the spoil bank. When operating under extreme

conditions, from bottom of cut to top of dump is a lift of 170 ft. The shovel will dig and move 25,000 cu.yd. per month in virgin soil, a nine-hour day being worked. It will recast 45,000 cu.yd. in that time.

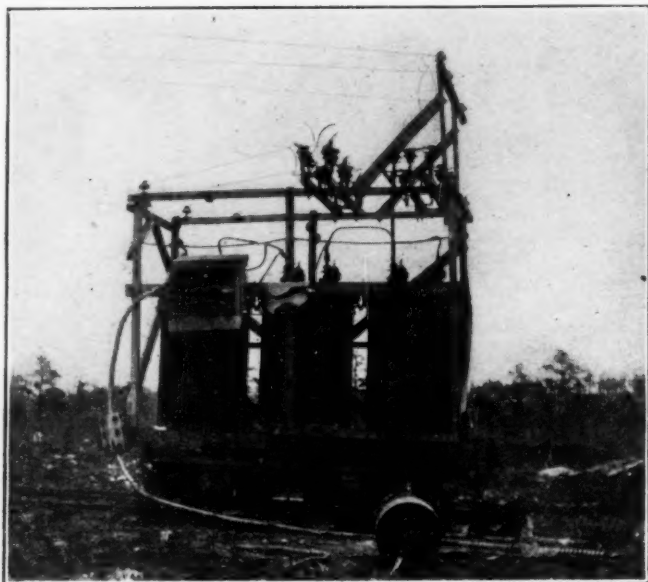
and gives excellent satisfaction. Practically no work is done by this member. The diameter of the boom extension rope is  $\frac{5}{8}$  in.; its total length, 1,300 ft. A Waterbury rope is now being used for extending the boom.

The dragline excavator here used has a rated capacity of 140 cu.yd. per hour. This with an eight-hour shift gives a capacity of 22,000 cu.yd. per month. During the summer time this capacity has been increased some-



### Cross-Section of Trough

Though the bed is only 20 to 40 ft. thick, which is thin for the Mammoth Bed, the bend is so sharp that a large body of coal is found on a small acreage. The width to be uncovered is only 230 ft. and tapers down to nothing at the bottom. The 85-ft. cover is unstratified material—gravel, clay and a few boulders.



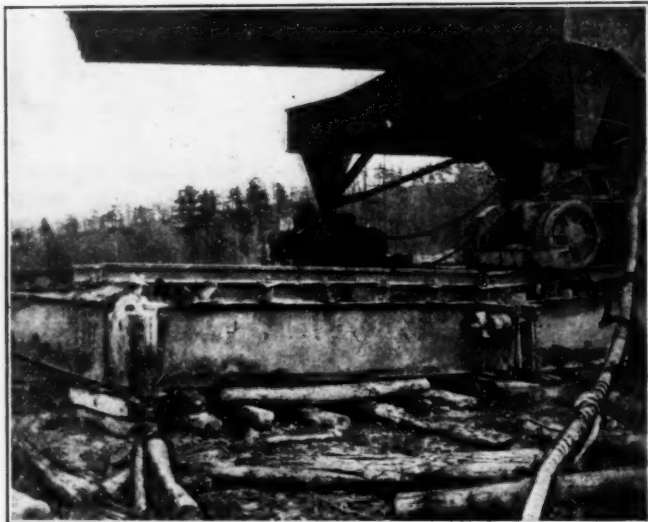
TRANSFORMERS ARE MOUNTED ON TRUCKS

The transformers receive their current at 11,000 volts and step it down to 440. The current is received from high-tension lines from the Hauto plant of the Lehigh Coal & Navigation Co. The transformers are large and somewhat topheavy and will soon be replaced by three which are smaller and more compact.

what, 26,000 cu.yd. having been handled. In winter the ordinary capacity runs to 19,000 cu.yd. per month.

In winter stripping is quite difficult. The machine is situated a considerable distance from any means of transportation and during the past winter from early December it could only be reached by sleds and the men therefore had to be hauled to and from their work three to four miles by sled each day.

Moreover, severely cold weather prevailed, and the frost penetrated the ground in some instances to a depth of five feet. This made it necessary to drill and blast the overburden. It is customary to drill three 10-ft. holes about 10 ft. apart and 13 ft. from



MOVABLE TRACKS SUPPORT AND HOLD EXCAVATOR

Track sections of the heaviest construction are used to sustain the heavy excavator (it weighs 350 tons) on the 85-ft. gravel and clay bed that covers the coal. The machine is always near the edge of the big cliff that its industry has created and its footing is rendered none the surer by that fact. Each unit of the track is nearly square. Four I-beams set on edge and se-

curely riveted form the sides of the square. An I-beam brace placed diagonally across the middle of the frame gives it additional strength and stiffness. Two-rail tracks each with a 24-in. gage are bolted fast to the ties, and when it is necessary to move the machine forward the whole unit is picked up bodily without unbolting any part of it and moved wherever desired.

the edge of the bank. These are sprung or chambered with dynamite, and then each is loaded with three kegs of black powder. The charge is fired electrically. In summer it is of course unnecessary to blast the soil, it being sufficiently loose to be readily dug. Six men handle the dragline excavator. Practically all operations on the machine are performed mechanically, and consequently require only a few men.

#### IF CUT IS WIDE REHANDLING IS INEVITABLE

A dragline excavator of this type is open to the objection that when the pit being excavated is wide it will be necessary to rehandle the spoil. By glancing at the illustration showing the pit at its widest point it will be observed that the excavated material from the first cut will have to be recast three times while that from the second cut must be recast twice and the spoil from the third cut recast once.

On the opposite side of the pit the spoil from the fifth cut has to be recast once. This makes it necessary for the material to be handled in this case four times for the first cut, three times for the second, twice for the third and fifth, while the spoil from the fourth and sixth cuts need be handled only once.

In the next section comparatively little rehandling is required, since the cut is narrow, while in the third or last section the spoil has to be handled only once. The best results can be secured with this type of machine when the cut is narrow and the excavator is not compelled to handle its spoil more than once.

Although in this case the excavator is compelled to rehandle the excavated material the cost is not greater than it would be with other types of machines for the same purpose, since with them auxiliary means must be provided in order to remove the spoil from the bed. The Lehigh Coal & Navigation Co. is now investigating various types of machines and methods of operation that may obviate the necessity of the excavator rehandling the spoil.

At this stripping operation the coal will not be handled by mechanical excavator or other means, but will be mined in a manner similar to that now employed in working the Mammoth Bed elsewhere in this district. Two tunnels or gangways will be driven in the rock near the bottom or base of the coal, and these will run parallel to the apex of the fold in the bed. Risers will then be driven through the rock to the coal and then breasts will be driven to the surface. The coal will then be mined from the top and shot down the breasts to the haulage roads, where it will be loaded onto mine cars and transported to a breaker for preparation.

#### Philippine Coal Mines To Be Developed

**S**IGNS of industrial expansion in the Philippine Islands are seen in the recent formation of a company which is developing the Cebu coal mines as well as those in Mindanao. It is expected that within a comparatively short time the output of these two islands will be sufficient to supply the needs of the whole archipelago as regards good steam coal.

The Mindanao product, which comes from what is known as the Sibuguey coal field, is claimed on the one hand to be superior to any other Philippine coal or any coal imported into the islands, while, on the other hand, it is said to be liable to deterioration if not used promptly, and to be probably of a quality more comparable to Borneo coal.

# Illinois Mining Institute Holds Seventh Annual Summer Meeting in Chicago

Saline Coal Dust Declared To Be of Excessive Explosibility —  
Papers Read on Labor Problem and Vocational Education —  
Machine Cutting Urged as Means for Reducing Mine Accidents

BY DONALD J. BAKER  
Pittsburgh, Pa.

WHEN the Illinois Mining Institute met to hold its seventh annual summer outing a program had been arranged that called for a more extended discussion of the sociological problems confronting the coal-mining industry than the institute has hitherto indulged in. The meeting was called at the La Salle Hotel, Chicago, on June 23. The first session, which was for the transaction of business, was called to order at 10:45 a.m. by the president, William Hall, who also is president of the Illinois Miners' Examining Board. William H. Thompson, Mayor of Chicago, was to have given an address of welcome to the convening institute members, but owing to an eleventh-hour cancellation, Dr. John Dill Robertson, Commissioner of Public Health, substituted for the head of the municipality.

In welcoming the delegates to the city, Dr. Robertson said in relation to the smoke nuisance that the Chamber of Commerce of Chicago had recently expended \$20,000 in compiling data for a report on Chicago's so-called "smoke horror." Dr. Robertson stated that the results of the investigation showed that in that city over \$40,000 is wasted yearly as a result of imperfect combustion, while a further sum of equal size is lost through the shipping to the city of dirty coal for factory and domestic consumption.

Chicago, with a population of over 2½ millions, loses through tuberculosis and pneumonia twenty-four persons daily. These deaths, Dr. Robertson believes, are directly attributable to the large amounts of dust and soot in suspension in the air of the city. Black wash, a condition of the lungs resultant from breathing soot-laden air, is highly prevalent around manufacturing centers and will be until such time as more perfect combustion has been attained.

## HEALTH MEASURES MINE OWNERS MIGHT COPY

Commenting on the water supply, Dr. Robertson said that the city uses 800,000,000 gal. daily, all of which has been chlorinated. As a result of the scheme of passing chlorine gas through the water, Chicago has the lowest typhoid death rate of any city in the country. Chicago also uses 700,000 gal. of milk daily, but this necessity is not permitted to reach the consumer until it has first been heated to a temperature of 140 deg. F. Dr. Robertson's talk was well received by the institute members, many of whom were entirely ignorant of the innumerable problems that confront the department of health of a large city. In closing he extended a hearty welcome to the convening delegates.

The response to Dr. Robertson's address of welcome was made by George Bagwill, state mine inspector of district No. 11. He thanked Dr. Robertson for the reception accorded the institute and stated that the time was

already at hand when closer co-operation was possible between large cities and coal-mine officials, in order that a better quality of coal might be delivered to city consumers, thus helping to alleviate to some extent the imperfect combustion of the product. Mr. Bagwill regretted the passing, since the last meeting, of Joseph C. Thompson, formerly chief of the Illinois Department of Mines and Minerals. In closing, he urged a larger attendance at the institute meetings of mine managers and their assistants.

By vote of the members, the following were called upon to make extemporaneous speeches: Colonel M. H. Madden, editor of the *Steam Shovel and Dredge*; W. C. Pomroy, editor of the *Illinois Journal of Labor*; Dean H. H. Stoek, professor of mining engineering at the University of Illinois, and Patrick Donnelly, of the du Pont Powder Co.

## JAMES TAYLOR DISCUSSES LABOR DISCONTENT

Professor Stoek announced that if any delegates knew of fires underground arising from spontaneous combustion, he would highly appreciate their being reported to him, that they might be investigated.

In the afternoon business session James Taylor, economic investigator of the State Department of Mines and Minerals, read a carefully-prepared paper entitled, "The Cause of the Discontent Among Miners and Laboring Men." Mr. Taylor read this paper at the last meeting of the American Mining Congress, which was held in St. Louis, but many of the delegates did not have the good fortune to hear him at that time. His article was well received. In Mr. Taylor's opinion, the wants of the laborer are increasing with his intelligence, and the statement that "The rich are growing richer and the poor are growing poorer," is not without foundation. "It is not the right of capital," said Mr. Taylor, "to decide the basis of labor organization." Only through a better understanding between labor and capital will come peace.

## SALINE DUST HAS EXCESSIVE EXPLOSIBILITY

There was no discussion of Mr. Taylor's paper. George Bagwill, a state mine inspector and first vice-president of the institute, read the other paper of the afternoon. This was entitled "The Explosibility of Southern Illinois or Saline County Coal Dust." Mr. Bagwill has assisted at the experimental mine near Bruceton, Pa., in the making of many tests with dust from this county. His paper dealt largely with the results of these observations.

The State of Illinois was among the first to take advantage of the Bureau of Mines' equipment and apparatus for determining the explosibility of its dust. Pul-

verized coal from certain counties of Illinois is more sensitive to ignition than others, but none of the dust that has been tested has been found immune to ignition when subjected to conditions such as exist when a shot blows out.

Mr. Bagwill related how dust had been placed near a small cannon in the experimental mine and the cannon fired. When coal dust from Saline County had been used the force of the explosion was of such magnitude that the concussion and flame passed through 50 ft. of rock-dust barriers, igniting dust taken from the Pittsburgh bed of coal which was strewn on the other side of the barrier. When the same experiment was tried with pulverized coal from Franklin County, the rock-dust barriers broke the strength of the explosion and failed to ignite the dust beyond, thus indicating that Saline County coal dust is more explosive than that from Franklin County.

In the discussion following the presentation of Mr. Bagwill's paper Dean Stoeck stated that the greatest evidence of the explosion was usually found at the end of the return airway. It was his belief that, all things being equal, the initial concussion would cushion itself upon the incoming air and, meeting with resistance here, would take the path of least resistance, which would be in the direction of the air current. In this manner he accounted for the fact that in shaft mines when visited by an explosion greater damage was often apparent at the bottom of the upcast shaft than at the downcast.

James Taylor lamented the fact that Illinois dust had not been used exclusively in the experiments near Pittsburgh, although he it said that for all practical purposes it had been so used. It was Mr. Taylor's opinion that in testing coal dust from Illinois the same degree of humidity and the same quantity of air should be in circulation during the experiment as was found in the mine from which the coal had been taken. "Not until this is done," stated Mr. Taylor, "will the experiments have any practical value." However, there were many who took exception to Mr. Taylor's viewpoint.

#### BRAKE SAND ON TRUCKS DEADENS EXPLOSION

J. F. Fleming, of the faculty of the University of Illinois, remarked that sand spilled along the haulage-ways by the locomotives was a big factor in breaking the force of a dust explosion and cited certain explosions in the state where he had made observations. In some cases the sand and rock dust on the floor when thrown into circulation had been of sufficient thickness to completely arrest the progress of the wave. It was not believed by the majority of the members that an effective sprinkling system could be installed, nor that it was possible to keep the entries clean at all times, although the state mining law demands that one of these alternatives be provided.

It is not on the floor that the greatest hazard exists, for the accumulation of dust is larger on the ledges in the roof and in the crevices of the rib. Donald J. Baker remarked that the cement gun could be used to advantage by giving the roof and rib a thin coating of concrete. In this way there would be less surface afforded for the accumulation of dust. If it was not desirable that the entries be lined with cement throughout, it was at least feasible to isolate certain panels in the mine and thus circumscribe the extent of an explosion.

The discussion of Mr. Bagwill's paper ended when one member stated that explosions would be practically eliminated if mining machines were installed, and permissible explosives used after the coal had been undercut. There is little doubt that shooting off the solid is a highly dangerous method of bringing down coal. Some believed that a state mining law should be enacted that would forbid this practice. However, the speaker believed this would not be necessary if every operator would install within his mines machines for cutting coal. There is certainly no statute at present that forbids the use of machines, and to this degree every operator is able to decide for himself whether he will hazard a coal-dust explosion.

After the appointment of two committees on resolutions by the secretary, Martin Bolt, the meeting adjourned.

#### INSTRUCTIVE SIGHTSEEING FILLED SECOND DAY

The following day was set aside for sightseeing. In the morning nearly all turned out for a visit to the Union Stock Yards and an inspection trip through the plant of Armour & Co. This feature was perhaps more thoroughly enjoyed than any other the Entertainment Committee had arranged. The meat packers have long been noted for the efficient operation of their plants and there was not one of the institute members who did not carry away with him a distinct impression of the importance of one man doing a certain thing and doing that thing well, if maximum production is to be attained.

After lunch a visit was made to the works of the Goodman Manufacturing Co., where a royal reception was accorded the visitors. Every piece of equipment that is made by this concern is first thoroughly tested before shipment to the buyer. Special devices for the testing of locomotives and mining machines attracted considerable attention. Later in the afternoon a visit was made to the factory of the Justrite Manufacturing Co. This company is equipped to turn out 5,000 carbide lamps daily, and the automatic devices that make this capacity possible are almost innumerable.

The banquet at the La Salle Hotel in the evening was not up to the caliber of former ones—so older members said. It was here that the late director of the Department of Mines and Minerals, Joseph C. Thompson, appeared to be most sadly missed. A pall seemed to hang over the banqueters, which even extended to the speakers of the evening, for there were many who commented on the passing of Mr. Thompson. The president, Mr. Hall, acted as toastmaster and called upon the following men for addresses, all of whom responded: J. A. Ede, consulting mining engineer for the Illinois Zinc Co.; W. J. Gates, St. Louis manager of the Caldera Purga Co.; Thomas Back, state mine inspector of district No. 2; Adam Currie of the La Salle County Carbon Coal Co.; Colonel M. H. Madden, formerly president of the Illinois Labor Board; James Taylor and Martin Bolt, assistant director of the Illinois Department of Mines and Minerals.

#### MADDEN URGES WORKMEN'S OLD-AGE PENSION

Colonel Madden, who is most highly revered by the members of the institute, after his address was given the most generous round of applause. He traced the growth in the progress that had been made in giving the workingman a square deal. "No industry should survive," said Mr. Madden, "whose laborers are not

paid sufficiently to assure them the right to raise their families according to the present standards of American living or guarantee to these men a pension when they have passed their period of active usefulness." The price of the product of any industry must be high enough to warrant the expenditure necessary to achieve these ends.

The original program called for a boat ride to Milwaukee on Friday, but because of a misunderstanding eleventh-hour plans had to be formulated, and it was finally decided to take a lake trip to Benton Harbor, Mich., instead. That the business session scheduled for Saturday morning might not suffer by reason of the lateness of the boat arriving back at Chicago the day following, this session was moved forward to Friday morning.

#### MOVE TO MAKE ATTENDANCE GENERAL

The final business session was called to order by the chairman, Mr. Hall, with Mr. Back acting as secretary, it being necessary for Mr. Bolt to absent himself from the trip on Lake Michigan. Resolutions were adopted in which sympathy was extended to the family of Joseph C. Thompson in its bereavement.

In an extemporaneous speech, Frank Lewin, of the Mancha Storage-Battery Locomotive Co., called attention to the fact that while the membership of the organization was all that it should be in point of numbers and while the finances were in excellent shape, yet there was something missing that was of more vital importance than either of these two. By this Mr. Lewin meant that not enough members were attending the meetings. The absence of many mine managers and their assistants who are members could, he thought, be remedied if the higher officials of the coal companies could be induced to defray the convention expenses of these men. This could only be accomplished if the purposes and interests of the institute were more generally known.

Mr. Lewin thought that a committee composed of men who were traveling all over the state would form an excellent nucleus for the spreading of the propaganda for larger attendance. A committee composed of Mr. Lewin; E. G. Lewis, of the Chicago Sandoval Co.; Samuel Jenkins, of the Goodman Manufacturing Co.; Milo McQuown, general manager of the Egyptian Coal & Mining Co.; John Streble of the Egyptian Spring Creek Coal Co., and Philip Phaler, of the Superior Coal Co., was appointed to promote systematic boosting for the institute in accordance with the ideas of Mr. Lewin. Following the appointment of this committee the report of the Auditing Committee was heard.

#### VOCATIONAL EDUCATION NOT FLOURISHING

The paper of the morning, entitled "The Value of Vocational Education to the Miner," was read by Thomas English, superintendent of the state mine-rescue station at Springfield, in the absence of the author, Thomas C. Wright, of Belleville, Ill. Mr. Wright's paper while short, had been carefully prepared and brought forth the most interesting discussion of any that had been read.

Thomas Back declared that out of a class registering eighty-four which he had volunteered to teach, only fifteen completed the course. Of the fifteen who had remained five had taken the state examination for mine manager and four had passed successfully. Mr. Back

stated that the greatest difficulty in holding the attention of the class had been caused by the introduction of problems that apparently bore no direct relation to the work for which the men were trying to fit themselves. He said that while the class would be intensely interested in mathematical problems, there was an immediate reaction when problems of mining law and first-aid were brought up. Another factor that made vocational teaching difficult was the distractions which existed when the school was located in a large town. A dearth of textbooks had made the work doubly hard, although this had been overcome to some slight extent by the utilization of correspondence-school pamphlets.

Mr. Bagwill, who had considerable experience as a teacher in vocational training schools, had encountered the same trouble as Mr. Back. In one class that he had taught 130 men began the course but only thirty had completed it. Mr. Bagwill said there were two classes of men who attended the opening of a vocational school. One of these was composed of a type of men who realized what the knowledge received meant to them in the betterment of their positions, and what they would have to do to satisfactorily complete the course.

#### THOUGHT PRESENCE GUARANTEED CERTIFICATE

The other class, Mr. Bagwill affirmed, was composed of men who did not have any intention of applying themselves to the tasks at hand and believed that merely their presence was sufficient to attain for them the cherished reward. Mr. Bagwill had held the attention of his classes by changing onto some other subject when the appearance of the men had indicated that their interest was lagging in the subject under treatment. Although this change sometimes meant the introduction of a subject quite foreign, yet he believed the scheme worth while, for interest had usually been maintained at fever heat.

Dean Stoek declared that the public-school teacher must be enlisted if the work is to assume any magnitude and be productive of definite results. He stated that the short summer course that had been tried at the University of Illinois had worked out well, yet he did not believe that this was the place where the men should be taught. Men school teachers are needed, as the nature of the subjects taught was more often rudimentary and did not require college professors. He did not believe that women teachers could do the work successfully, and at present the men teachers could not be found by reason of the small salary paid them. If vocational teaching is to be made worth while, a living wage for the teachers would have to be provided first. In bringing the discussion to a close, Dean Stoek made a motion that the executive committee of the institute when drawing up the program for the next meeting, which would be held at Springfield in November, should set aside a portion of the time for the further discussion of this topic. The motion was unanimously carried, after which the meeting adjourned.

In the afternoon the steamer docked at Benton Harbor and some of the members bathed in the lake near Silver Beach, at St. Joseph City, while others turned to the numerous entertainment facilities afforded at the park at that place. Supper was served at the House of David, in Benton, among the famous bewhiskered tribe of the Israelites. Following the supper, which was strictly vegetarian, the trip back to Chicago by steamer was made without incident.

# How Shall the World's Biggest Trust Be Dissolved?\*

Cessation of War Makes Necessary Lifting of the Monopoly Created for Its Successful Prosecution — It Is Futile to Seek Short Cuts to Relieve the Situation — Avoidance of Drastic Measures in Restoring Normal Conditions Is the Perplexing Problem

BY JUDGE MILTON C. ELLIOTT  
Washington, D. C.

**U**NDER normal conditions there are few laws which can be said to control private business. Going back to its origin, law, according to the text writers, is defined as a rule of conduct prescribed by the law-making power. All of us, I think, have an inherent objection to having our rules of conduct prescribed by anybody, whether married or single, and our ancestors had that very deeply ingrained in their makeup.

Therefore the laws governing rules of conduct are limited very definitely by our Constitution. Under normal conditions, practically the only laws, so far as the United States Government is concerned, which can be said to control private business, are those which relate to businesses like yours, which are necessarily engaged in interstate commerce. Those laws prohibit combinations in restraint of trade; they prohibit unfair practices—they regulate it to a limited extent.

The framers of the Constitution not only limited the subject matter that legislation might deal with but, as you all know, they created under the Constitution the system of checks and balances. They vested in one body the power of making the laws; in another the power to enforce them, and in the third body the power to interpret those laws, so they adopted every possible safeguard for business in normal times.

## CENTRALIZATION NECESSARY IN WAR TIME

The laws controlling or regulating private business in normal times are limited and few, but in times of war or times of national emergency it is consistent with our Government that the power should be centralized in the Government. No democracy could successfully prosecute a war if it had to get an act of Congress for every move. No democracy could successfully prosecute a war without making the resources of the country available and placing them in the hands of the Government.

So it was consistent and not in violation of our Constitution in time of war to centralize in the Government the power to take over and control the railroads; through other bodies to control the telegraph and telephone systems; through the Food Administration to control the national food supply, and through the Fuel Administration to control the distribution of coal, and through the War Industries Board to control other essentials necessary to prosecute the war.

As I say, that was entirely proper and consistent with the spirit of our Constitution, and that was what was done. The Constitution, however, provides among other safeguards that the fruit of every man's labor—his private property—shall be held safely and that it shall not be taken from him without due process of law.

Therefore it was necessary in taking over these resources to compensate those owners. To do this it was necessary for the Government to borrow several billions of dollars, and this made it necessary for the Government to control to a very great extent even the credit resources of the country, having to go to citizens for enormous sums of money. Therefore the Capital Issues Committee was created, with power to pass upon all issues of stocks and bonds to determine whether the proceeds were going to be used for war purposes or non-essential purposes.

Having then taken control of the resources and credit, the Government had to provide means of furnishing credits and money to essentials, so it created the War Finance Corporation to make loans to those essential industries who could not procure the money otherwise.

## WORLD'S GREATEST MONOPOLY DUE TO THE WAR

As a consequence of this war it was necessary for the Government to create the largest monopoly ever created in the world. The biggest trust that was ever created in the world was created as a necessary instrument of the war. Now we stand at a period when the Government is going to dissolve that monopoly, and the situation is further complicated—the task would be great at any time—by the fact that during the period of the war we became a world center of trade and finance, and so the dissolving of that monopoly means the adoption of a great many new rules.

The problem that confronts the country today is one of serious consequence and one for which, I think, there is no short cut or panacea, despite the fact that we hear of these panaceas on all sides. The real problem, however, as it appears to me is this: We have changed, in order to meet this national emergency, from a democratic form of government to a bureaucratic form of government. It has been necessary to leave the orderly processes of normal times and to centralize in these government bureaus things that approach legislation and regulation, interpreting their own regulations, and we have to untangle and dissolve this great monopoly.

There are some who advocate repeal of all war measures and that we go back to normal, selling all the Government commodities so as to reduce the cost of living. Even those who advocate this—the producers—do not want the commodities sold in competition with goods which have been bought and sold at high prices. They want regulation. Even those who want to cancel and repeal all war measures immediately are not of one mind.

There is another group of extremists who want to perpetuate this government control, this bureaucratic

\*Address delivered at the third annual convention of the American Wholesale Coal Association, Pittsburgh, Pa., June 1, 1920.

form of government, and they are working very subtly, I think, to accomplish their ends. Take, for instance, the railroad situation, which has been explained to you so clearly here. The most conservative advocate of the preservation of private property would never have undertaken to repeal war measures and turn the war measures back in the condition they were in at the end of the war. It would have meant receivership to 90 per cent.

It was necessary to have some form of legislation. Now, I am not an advocate of the Transportation Act of 1920. It has, I think, many faulty and unsound things in it, but it was necessary to cover this period of transition in some way. It was necessary, to provide for the relief of congestion, to find some means of financing the roads in that period. What happened? It guarantees the roads a period of standard return and provides that in an emergency such as has arisen recently the Interstate Commerce Commission place an embargo on freight. Now the minute the railroads go to the Interstate Commerce Commission and ask for relief these fellows advocating Government control immediately begin to cry that the Government has made a failure, and private ownership is not going to succeed. What are the facts? There are 230,000 cars waiting to be moved.

#### LEGISLATION WILL NOT MOVE CARS

In the last analysis those cars are not going to be moved by railroad Government legislation. They require labor and engines to move them. Their relief may be facilitated by the priority order, but legislative regulation is not going to straighten out this situation.

There is still another class that wants to see the Government destroyed entirely. I am not very familiar with the refinement of socialism, radicalism, or whatever it is. Of course, they don't want to regulate the rights of private property, but in a certain aspect those who consciously or unconsciously are advocating a permanent paternalistic Government are more dangerous to this country than those outlaws who want to overthrow the Government.

The difficulty about it is that it is so hard to keep from playing into the hands of those who believe in Government control and ownership of railroads. As has been pointed out, that will be merely the entering wedge. Once they establish the principle of public ownership it is going to extend through all our industries. Every time those of us who believe in the old fundamental principles that our ancestors fought to establish go down to Washington and ask for the creation of another bureau or adjustment of our difficulties through some new board, in a certain sense we play into the hands of those who want to perpetuate this kind of government.

The problem is essentially one to be solved by the business men. I don't think it is going to be solved in a day. I am optimistic. I believe ultimately we are going to get back to those principles which are the foundation of this Government, but I don't think it is going to come in a day, and it isn't coming through any short-cut method. It is coming through the display of conservatism by American business men. It is coming from realization that, whatever business they are in, it has to be done from a purely national and not a purely local standpoint. The business man must see the other fellow's standpoint as well as his own.

Take for instance, the railroad situation. We know the railroads cannot be operated on the existing freight

rate. We know the Government, without an increase of freight rate, could not operate and pay expenses. We know there is an average of two million dollars a day for ordinary expenses, and to keep the railroads going they need an increase in the freight rates, and they must have this relief in order to move the coal that you gentlemen are selling.

Therefore your problem is a railroad problem. The railroad problem is your problem. These functions have got to be worked out by a spirit of co-operation and a spirit of understanding on the part of the American business man.

One great danger, as it appears to me, in the future of this country is what we popularly call class control—one class working for one end, in utter disregard of the rights and privileges of another. We see it in every aspect. We see the movements quietly going on. We see this Constitution which our ancestors fought for, which was intended to represent the maximum of power, legislative and judicial, regulated by the popular plan of organized vote.

We see the Constitution tampered with. We have seen the power under Interstate Commerce rule extended beyond what it was in its inception, and it is very hard now to draw the line. The quasi-public corporations are beginning to include more and more corporations, and the movement is on, quietly working, to bring about a Government paternalism that will destroy all individual effort, all individual incentive, and substitute a bureaucratic for a democratic form of government.

#### BUSINESS MEN MUST SOLVE THE PROBLEMS

I regret that I cannot offer any short cut, any panacea. My only thought is that the business man must think these problems out. The business man must use his influence in the proper way. A great association, non-partisan, as this is, can do a great work, but when legislation is advocated don't wait until it has been passed and then cuss the legislator, but when it starts use your influence to give these gentlemen who have that big responsibility the information to enable them to act intelligently.

As my friend Mr. Cushing has referred to the man back home, I recall this story of the President when he was asked to speak at Stamford. He said he had lived there and he couldn't refuse. He told a story about Daniel Webster, who was asked to speak to a certain body. Dan said he was very busy; the legislative work took up all his time and he wouldn't be able to go. The man who asked him started in and used every argument he could think of, but it was no use. Finally he said, "Well, all right, but I don't know what the folks back home will think."

Dan said, "Folks back home? Damn it, why didn't you mention that in the first place? I will go with you this afternoon."

The real work in a legislative body is done back home. They can't be experts on fifty thousand propositions, and I wonder sometimes that the laws are as good as they are, but the work has got to be done in the beginning. This movement has to be stopped in the beginning, and the way to get in your work and exercise your influence is to meet your home Congressman as Irishman to Irishman. The business men must get to work. We must do our part, and if we are going to preserve the independence of private business it has to come through the concerted action and continuous working action of the business men of this country.



## Discussion by Readers

Edited by  
James T. Beard

### Are the Miners Un-American?

FROM the start, it has always seemed that *Coal Age* has been the friend of the miner, judging by the fair and just manner it has dealt with labor problems whenever they have arisen. However, in dealing with the labor situation, not long since, an article appeared under the heading "Miners' Demands Un-American," *Coal Age*, Feb. 5, p. 275. The article is a report of the statement of Attorney Rose, made before the commission appointed by the President to investigate the bituminous coal industry.

Recent events seem to have proved that the miners were, in a measure, right in their demand for a living wage and a shorter working day. It can be truthfully said, as has already been stated, that there are today 150,000 more miners than are required to produce the coal needed in this country. In other words, there is a large surplus of labor in the mines. The question of production of coal is not one of shortage of labor, but rather one of car supply and steady work in the mines. These are items that lie beyond the control of the miner.

Let it be considered that, in all of our large coal mines, the miner is compelled to stay underground practically from nine to eleven hours, by reason of the worn-out agreement of "Eight hours work, at the working face." Set this fact side by side with the adoption of a shorter workday, in war-torn Europe, and then judge the miners' cause and say whether it is un-American for him to ask for relief from a custom that is dragging out his life and energy.

#### WHAT ENGLAND HAS DONE FOR HER MINERS

Even England has given its miners a seven-hour day, "from bank to bank," with a six-hour day commencing June, 1921. Are American ideals to lag behind those of other countries? Is it American to make a machine of a man? Or, is it un-American to ask that this custom be changed so as to be more humane?

The late war proved the loyalty of the American coal miners and showed, beyond a doubt, the truth of their claims regarding production. It is unfortunate that the miners have in their ranks thousands—yes, hundreds of thousands—of foreigners whose sympathies were not in favor of our war program. But the loyal minority of American miners was able to keep this mass of their fellow workers in line. Washington knows this; the coal operators know it and the miners know it. Indeed, no one questioned the loyalty of our coal miners during the war. If the miner was not un-American then why is he "un-American" today, when asking a living wage?

I have spoken of recent events proving that the miners were right in asking this consideration. No one will deny that the price of necessities has continued to soar higher and higher, while a privileged few are still permitted to manipulate consumption and production

in the personal interest of the richer classes, while the many toilers throughout the land are barely able to maintain a decent existence.

Note for example the "overall craze." It was started to enrich a few at the expense of the worker. Who has a right to wear overalls more than the workman? Yet, this craze has raised the price of overalls three and four times, while those responsible for the craze have thrown them aside as not needed, and the worker is not able to buy them with his limited means.

#### DOES THE TREATMENT OF MINERS IN THIS COUNTRY UPHOLD AMERICAN STANDARDS?

It must be admitted, as facts prove, that those who live from the profits of labor can never reason from the same standpoint as the laborer. Speaking of the large class of foreign miners now employed in the mines in this country, it seemed to promise to be a paying proposition, from the viewpoint of the operator. The foreigner, however, having lower ideals in regard to living and working conditions, forms a class of labor that is able to accept a lower wage; and large numbers of American miners have been forced into other industries in order to find support for their families. Let me ask, Is this condition American? Does it uphold American standards?

Again, as a closing thought, allow me to ask, Is there anyone who is familiar with the operation of a coal mine—a fair-minded operator, superintendent or other mine official—who can honestly say that the award of the said commission was not a serious blunder and an injustice to thousands of skilled daymen, who were refused the 27 per cent increase, while the miners' pay was increased 24c. a ton, or practically 34 per cent of their former wage? Yet, the majority of the commission refused to concede to the daymen the increase asked, which would equalize conditions and be a just concession to a large and faithful class of workers. Let us hope that there may be some way yet found to alter this decision, in justice to all.

Staunton, Ill.

W. M. CHAMBERS.

### Give the Ambitious Worker Every Chance

REFERRING to the story told some time since in *Coal Age*, Feb. 12, p. 327, by a worker who made application to his superintendent to be transferred from a substation of which he had charge to the work of bonding rails in the mine and was refused with abusive language, all will agree that there was no excuse for the superintendent using violent language or showing any temper when confronted with such a request.

What has already been written regarding this case proves the fact that an ambitious worker who merits promotion should be helped rather than kept back. It has also been shown that a superintendent's side of the question may and often does present a complex problem.

On that account we should not be hasty in condemning an official's judgment in refusing such a request on the part of an employee.

There may be reasons known only to the superintendent why the change should not be made. If the substation engineer was a good man and capable in that line of work, which he doubtless was since the electrician wanted him in the mine, he had one of the essential qualifications for promotion. In such a case, it is my opinion that a superintendent would not be justified in holding the man in a position lower than what he was qualified to fill, any longer than a reasonable time to get another man for the place.

The vision of an ambitious man penetrates beyond the walls of a substation. So far as hard work is concerned it was a "soft berth." Too many men are not interested beyond getting something "soft," requiring little headwork or bodily exertion. If a man is ambitious enough to seek work demanding greater physical and mental effort on his part he deserves recognition and is no doubt a valuable man.

When a man's ability promises well for himself and his employers, it is not fair to hold him back. Many famous men in all walks of life started at the bottom. At that time, neither they nor anybody else dreamed that they would ever climb to the top. Generally, when a man wants a chance at something better, it is a favorable symptom and indicates that he is probably capable of doing something better.

#### A SUPERINTENDENT'S JUDGMENT OF A MAN WILL SELDOM BE FOUND TO ERR

There are times, of course, when one will be deceived in promoting a man to a higher position or class of work than that in which he is at present engaged.

However, if one is a close observer and studies the man's past record his judgment will seldom err. If confirmation is needed, it is not always a sign of weakness to consult his foreman or his fellow-workers, in order to get a better idea of his personal qualities and capability. In any case, the worker can be given a trial, being made to understand that his old job will be waiting for him if he fails to make good in his new place, which is seldom the case.

In this instance, had the superintendent attempted to justify his action, by stating that he was not able to get another man for the place, he would be excusable for delaying to give the man a chance to do better. However, not knowing all the facts in the case, we can assume that there might have been something wrong, either in regard to the conditions at the substation or in the superintendent's method of training his men, which would account for the fact that no one was available to take this man's place. Usually, there are several applicants for such a place and little difficulty is experienced in finding the right man, with a proper system of training men for the work.

But look, for a moment, at the other side. The man's demeanor and his past record may make him responsible for the treatment he received, except only the abusive language used. This man may have been a close friend of the electrician, who may have encouraged him to show his independence and not be afraid to ask for what he wanted. Such contriving would naturally exasperate the superintendent and make him firm in his determination to assert his own authority, in spite of the man's fitness and capability for other work.

These different phases of the situation must all be considered in order to enable one to arrive at a just and right conclusion. The letter, which was written by the worker himself, evidently tells but one side of the story and, to judge correctly, one must know the real conditions as they exist. In saying this, I am not trying to condone or defend either the superintendent or the worker. I desire only to emphasize the importance of recognizing the merit of every ambitious worker and giving such all the chances that lie in their path, leaving it with them to make good. W. H. NOONE.

Thomas, W. Va.

#### Diagrammatic Illustration of Labor Turnover

AFTER completing what has seemed to me to be the only correct method of analyzing the annual payroll of a mine, as explained in my article entitled "Concrete Example of Labor Turnover," *Coal Age*, June 10, p. 1209, the thought was suggested that a diagram would show more clearly the difference between this method and that commonly used to estimate the average monthly earnings of the workers in a particular plant or industry.

Following that suggestion I prepared the diagram here shown. The curve marked "specific rates" shows

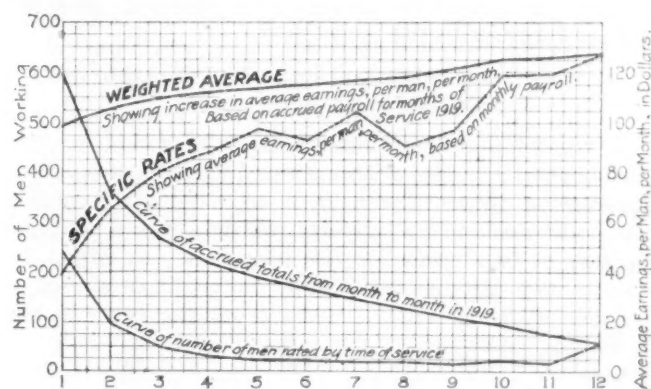


DIAGRAM OF AVERAGE MONTHLY EARNINGS PER MAN

the results obtained by a method commonly employed in averaging the monthly earnings per man. In this method, the total earnings of the men working one, two, three, etc. months is divided by the number of men who worked the corresponding length of time.

In strong contrast with this curve of estimated average earnings is the curve of "weighted average" just above the first. In this method of finding the average monthly earnings per man, the total accrued payroll for one, two, three, etc., months is divided by the number of men at work in each separate period.

The two lower curves show, respectively, the number of men who worked one month (239); two months (96); three months (48). . . . twelve months (56); and the accrued number of men on the payroll for one month (598); two months (359); three months (263). . . . twelve months (56).

As stated in my previous article and as is clearly shown by the curve of weighted averages, the true average monthly earnings of men increases directly with length of service. This is a factor worthy of careful consideration by workers who are accustomed to drift from one place to another and never stay long at one mine, and is of equal interest to employers.

Philadelphia, Pa.

W. R. R.

## Education Needed to Correct Abuse of Privileges by Miners

REFERRING to the article summarizing the results of the survey of housing conditions in the bituminous coal fields by the Bureau of Labor, *Coal Age*, May 20, p. 1057, one cannot but feel that the miners themselves are largely to blame for the unsanitary conditions reported as prevailing in western Pennsylvania, West Virginia, Ohio, Indiana, Kentucky, Tennessee, Alabama, Colorado and Wyoming.

In the anthracite field, experience has shown that miners, generally, greatly abuse the municipal and township laws. While this can be attributed partly to their ignorance regarding the laws, it is mostly the result of their habits and previous training. The large majority of miners who dominate the coal regions are of foreign birth and do not appreciate the moral influences thrown around them through the efforts of the companies that employ them.

The tenants of company houses, for the most part, appear to feel that they do the company a favor by renting their property and should receive more consideration than the other fellow who is not a company tenant. They do not realize that the low rent asked by the company, generally less than \$8.00 a month, is not sufficient to cover the taxes and upkeep of the property, let alone a small interest on the investment.

### COMFORTABLE HOME SURROUNDINGS NEEDED BUT NOT ALWAYS APPRECIATED

In my opinion, every miner's dwelling should be comfortable and provided with ordinary conveniences. But, observation shows that a four- or five-room house is commonly made to hold several boarders, while the family live in two rooms or the basement. In other instances, two families will occupy one of these houses.

Recently, while visiting a small mining town in the Wyoming valley where the mine owners had built 38 houses for their employees, the superintendent of the colliery narrated an incident that showed the abuses committed by miners in return for efforts made in their behalf. He said that, some two months previous to my visit, a flume had been built in close proximity to the little village of houses. The company had constructed this flume at a considerable expense, for the sole purpose of conducting the overflow water of a creek to prevent its flooding the cellars of the houses during the spring freshets, which had always been an annoyance to the tenants. Now, two months later, there only remained the postholes to show what had been done. Posts and boards had been carried off for firewood or to build chicken coops.

Another instance the superintendent related concerned a committee of miners, who came to him asking the privilege of picking up the butt ends of props and ties that were drawn out of the mine and unloaded on the rockdump. Permission was given them to do this, provided nothing over a foot in length was taken and they kept away from the tippie.

A week had hardly passed when a dozen 10 x 12 in. pine timbers, 16 ft. long, which had been shaped by the carpenter for installing at one of the landings in the shaft, had disappeared and could not be found, having probably been sawed up and used for firewood or for a foundation for a pig pen. These are only a few instances that show where miners fail to do their share

in maintaining good feeling between their employers and themselves.

During the period of the war our government proved what they could do in a short time in creating sanitary conditions in the camps they established. It would seem that it is now high time for the government to take some action to improve the sanitary conditions in mining camps. The question of educating these foreigners is a difficult one and all needed assistance should be given mining companies in the efforts they are making along this line. Schools and churches are needed, besides teachers and community workers. Much could be done if Congress would wake up to the necessity and realize their responsibilities in this regard.

### PRIVILEGES AFFORDED IN THE ANTHRACITE FIELD HAVE PROVED WORTH WHILE

The majority of the mines in the anthracite coal regions are located near cities, besides being provided with excellent schools for the children and night schools for the men. The same conditions are not to be found in the numerous isolated mining towns and camps in the bituminous fields. What is the result?

Advantage has been taken of the privileges afforded in the anthracite regions and many sons of coal miners, through the education afforded, have risen to positions of trust and influence. Many of them are among the most brilliant attorneys, judges and doctors in this region. The present district and assistant district attorneys of the Luzerne County Bar are examples of what education will do for the miner and his children. There are many similar examples that could be mentioned if space permitted.

The article mentioned referred to the dull uniformity and unattractiveness of the houses, the absence of trees, lack of sidewalks and the bad condition of the streets, in the usual mining camp. The same would be true in this region were it not for the untiring efforts of many anthracite operators, who have awakened a spirit of pride among their employees and induced them to beautify their properties by planting flowers and trees and keeping up their lawns.

### CONTESTS FOR PRIZES PROMOTE A WORTHY AMBITION AMONG THE WORKERS

Annual contests have been started and prizes offered for the best gardens and dooryards. It is my pleasure to say that many of these small properties compare favorably with the best residences of large cities. For the education of communities, free lectures are given during the winter season, on subjects relating to the mining of coal, prevention of accidents and sanitary living. These, together with the publication of bulletins of information, the maintenance of recreation grounds, places of amusement and other attractions, have succeeded in breaking the monotonous life of the miner and improving conditions generally.

Many of the miners have taken advantage of the privilege of depositing their savings in the banking systems established by the companies and which pay the same interest as other banks. Many miners are purchasing their homes, for which a small percentage is deducted from the monthly payroll. It goes without saying that this is the spirit that will bring efficiency into any mining camp or operation and develop good citizenship, which is an important consideration.

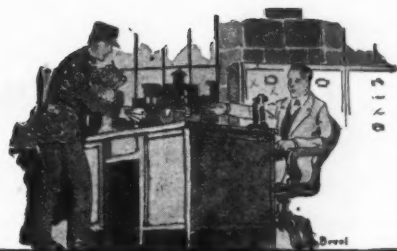
Plains, Pa.

RICHARD BOWEN.



# Inquiries of General Interest

Answered by  
James T. Beard



## Counter-Balancing the Load in a Single-Compartment Shaft

**R**EADING the inquiries and solutions given to problems, in *Coal Age*, leads me to submit one that has been a growing source of trouble in the operation of our small mine. The conditions are as follows:

We are operating a wagon mine and hoisting the coal by a horse-whim, in a shaft having a single cage. There is room enough in the shaft for a counterweight, and we have been thinking, for some time, of putting in such a weight to balance a portion of the load, but have not been able to decide what weight is required that will best answer the purpose.

The approximate load we are hoisting is as follows: cage 900 lb.; car 800 lb.; coal 1,800 lb.; making the total load on the rope 3,500 lb. With our present arrangement, this load is too great for the strength of the horse, and much delay and trouble results from this cause. Wishing to avoid the expense of getting an engine for hoisting this coal, it has occurred to us that the proper thing to do is to balance the load with a counterweight.

Kindly state what this weight should be to obtain the best results. Is there any necessity of altering the diameter of the winding drum; or is there any other arrangement that would serve the purpose and make the work easier on the horse? Would there be any advantage in using gears as some one has suggested?

Clinton, Ind.

BONDIS COAL CO.

While hoisting coal in a single-compartment shaft, there is always a great saving in power by counterbalancing the load. Otherwise, the load hoisted is a dead weight, and the descent of the cage and car into the shaft, after the coal has been dumped at the surface, represents an actual loss of available power, which is taken up in the friction of the brake required to control the descent of the load, instead of its being utilized to lighten the work of hoisting.

While installing gears, as suggested, would relieve the horse of much of the load, the time required for hoisting would be lengthened in the same proportion; and the work performed would be increased by an amount equal to the friction of the gears. There would be no advantage in such an arrangement. Also, to decrease the diameter of the drum would relieve the horse of a portion of the load; but, at the same time, lengthen the time of hoisting and there would be no saving in power.

The proper means to adopt, therefore, in order to avoid the present loss in power, is to counterbalance the load hoisted. In order to obtain the necessary weight of such a counter-balance, the aim must be to make the work performed in hoisting the load out of the shaft, equal to that performed when hoisting the counter-balance again to the surface. For example, when hoisting coal, the net weight hoisted, or the unbalanced load,

is 3,500 lb. less the weight of the counter-balance. Calling the latter  $x$ , the net weight hoisted is  $3,500 - x$ .

Again, when lowering the empty car and cage and hoisting the counterbalance, the net load hoisted is  $x - (800 + 900) = x - 1,700$ . Therefore, to find the value of  $x$ , we equate the net load when hoisting coal, with the net load when hoisting the counter-balance;

$$3,500 - x = x - 1,700$$

$$2x = 3,500 + 1,700 = 5,200$$

$$x = 2,600 \text{ lb.}$$

Hence, to equalize the load when hoisting coal and when lowering the cage and empty car, the weight of the counter-balance should be 2,600 lb. It is not necessary to consider the weight of the rope hanging in the shaft, as this is transferred from one side of the shaft to the other during each hoist. In the first half of the hoist the load is increased by the weight of the rope; but, in the second half of the hoist, the load is decreased an equal amount, which makes the effect of this weight, as far as the work performed is concerned, of no importance.

## Pressure In Atmospheres

**K**INDLY explain, in *Coal Age*, what is meant by the expression "an atmosphere." What is the pressure equivalent to 3,000 atmospheres?

Taylor, Pa.

MINER.

The term "atmosphere," as commonly used to express the pressure of compressed air or gases, is often taken to mean a pressure of 14.7 lb. per sq.in., which is the atmospheric pressure at sea level, under normal conditions. Roughly, atmospheric pressure at sea level is estimated at 15 lb. per sq.in. On that basis, a pressure of two atmospheres would be 30 lb.; three atmospheres, 45 lb.; five atmospheres, 75 lb. per sq.in., etc.

More correctly, the term "atmosphere" refers to the number of compressions to which a volume of air or gas is compressed. Owing to the decrease of atmospheric pressure as we ascend above sea level it is evident that an atmosphere at sea level will indicate a much greater pressure than an atmosphere at an elevation of 10,000 ft. above sea level. At this altitude, the normal atmospheric pressure is 10.107 lb. per sq.in., or practically two-thirds of what it is at sea level.

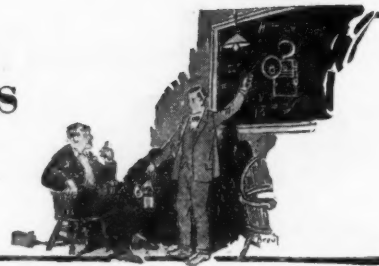
Therefore, when five volumes of air or gas are compressed into one volume, at an elevation of 10,000 ft. above sea level, the resulting pressure would be  $5 \times 10.107$  equals 50.535 lb. per sq.in. In other words, five atmospheres, at this altitude, would mean a pressure of practically 50 lb. per sq.in., instead of 75 lb. per sq.in., the equivalent of five atmospheres at sea level.

The pressure corresponding to 3,000 atmospheres at Taylor, Pa., where the elevation is practically 700 ft. above sea level and the normal atmospheric pressure 14.3 lb. per sq.in., is  $3,000 \times 14.3 \div 2,000 = \text{say } 214$  tons per square inch.



# Examination Questions

Answered by  
James T. Beard



## Miscellaneous Questions

(Answered by Request.)

**Ques.**—The quantity of air passing, at the bottom of a shaft, is 140,000 cu.ft. per minute and is divided into three splits as follows:

Split A, 6 x 9 ft., 9,000 ft. long; split B, 6 x 9 ft., 12,000 ft. long; split C, 6 x 8 ft., 6,500 ft. long. Find the natural division of this current of air between the three splits.

**Ans.**—The sectional area, perimeter and length of the airway, in each split, are as follows:

A, Area, 54 sq.ft.; perimeter 30 ft.; length 9,000 ft.;  
B, Area, 54 sq.ft.; perimeter, 30 ft.; length 12,000 ft.;  
C, Area, 48 sq.ft.; perimeter, 28 ft.; length 6,500 ft.

In split calculations, the operation is much shortened by taking the lowest relative values of the areas, perimeters and lengths. For example, the relative areas of these three airways are 9, 9, 8; the relative perimeters 15, 15, 14; and the relative lengths 18, 24, 13.

Therefore, finding the relative potential factor for each split we have

$$\begin{aligned} \text{A, } \sqrt{\frac{a}{lo}} &= 9 \sqrt{\frac{9}{18 \times 15}} = \frac{9}{\sqrt{30}} = 1.643 \\ \text{B, } &= 9 \sqrt{\frac{9}{24 \times 15}} = \frac{9}{\sqrt{40}} = 1.423 \\ \text{C, } &= 8 \sqrt{\frac{8}{13 \times 14}} = \frac{16}{\sqrt{91}} = 1.677 \\ \text{Total} &\dots\dots 4.743 \end{aligned}$$

Then, since the quantity of air passing in each split is proportional to the potential for that split, we have

$$\begin{aligned} \text{A, } \frac{1.643}{4.743} \times 140,000 &= 48,500 \text{ cu.ft. per min.} \\ \text{B, } \frac{1.423}{4.743} \times 140,000 &= 42,000 \text{ cu.ft. per min.} \\ \text{C, } \frac{1.677}{4.743} \times 140,000 &= 49,500 \text{ cu.ft. per min.} \\ \text{Total} &\quad \quad \quad 140,000 \text{ cu.ft. per min.} \end{aligned}$$

**Ques.**—What should be the ratio of the diameter of the air cylinder to that of the steam cylinder, in order to compress air to 100 lb. per square inch, when the steam pressure of the boiler plant is 75 lb. per square inch, assuming the efficiency of the compressor at 80 per cent?

**Ans.**—The steam pressure at the boiler plant being 75 lb. per square inch, allowance must be made for the drop in pressure in transmission to the steam cylinder of the compressor. No data being given, we will assume there is a drop of 5 lb. between the boiler plant and the compressor, making the effective steam pressure 70 lb. per square inch. Again, taking the efficiency

of the compressor at 80 per cent, to compress air to 100 lb. per square inch, will require an estimated pressure of  $100 \div 0.80 = 125$  lb. per square inch. In other words, the estimated ratio of pressure, steam to air, is 70:125; which is the inverse ratio of the area. Therefore, the area ratio, steam to air, is  $125:70 = 1.7857$ . But the diameter ratio is equal to the square root of the area ratio, which makes the diameter ratio, steam to air,  $\sqrt{1.7857} = 1.33$ , showing that the diameter of the steam cylinder in this case, should be one-third larger than that of the air cylinder. For example, a 9-in. air cylinder would require a 12-in. steam cylinder, on the assumed basis.

**Ques.**—What gain is effected by using high-pressure steam expansively, rather than low-pressure steam at full stroke?

**Ans.**—When steam is used expansively the valve closes the steam port before the piston reaches the end of its stroke. As a consequence, steam is admitted to the cylinder during a fraction of the stroke only, and a less quantity of steam is required. During the remainder of the stroke, after the valve has closed the port, the steam in the cylinder expands and not only is the work of this expansion saved, but the engine exhausts at a lower pressure than when steam is admitted during the full stroke of the piston. There is also less loss by condensation and greater efficiency results in the use of high-pressure steam.

**Ques.**—How much work is done in raising 300 tons of coal up an incline 2,700 ft. long and rising 1 ft. in 3, adding 40 per cent to the load, for friction?

**Ans.**—Adding 40 per cent gives a total estimated load, including friction, of  $300 \times 1.40 = 420$  tons. Then, taking the rise as one foot vertical in three feet of inclined measurement, gives a total rise of  $\frac{1}{3} \times 2,700 = 900$  ft. The total work performed in this case is, therefore,  $420 \times 900 = 378,000$  ft.-lb.

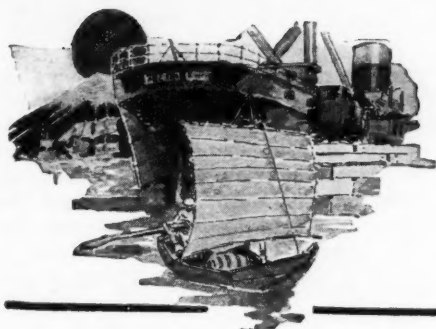
**Ques.**—Give the breaking strain and safe working load of a plow-steel, hoisting rope seven-eighths of an inch in diameter. State the factor of safety used.

**Ans.**—The breaking strain of a one-inch, cast-steel, 6-strand, 19-wire, hoisting rope is 34 tons. Since the strength of wire rope is proportional to the square of the diameter of the rope, the breaking strain of a  $\frac{7}{8}$ -in. hoisting rope is  $34(\frac{7}{8})^2 = 26$  tons.

A suitable factor of safety in hoisting practice will depend on the depth and character of the hoist. Under ordinary conditions, when the depth of the shaft does not exceed 100 yards, a factor of safety of five will be sufficient. This would make the safe-working load, in this case,  $\frac{1}{5} \times 26 = \text{say } 5$  tons.

**Ques.**—State an air condition that will cause distress while, at the same time, the air is chemically pure.

**Ans.**—When the oxygen content of the air has been depleted and is less than normal, distress will be caused in breathing; and yet the air may be said to be chemically pure, as being free from noxious gases.



## Foreign Markets and Export News



### Coal Imports of Italy in 1919

According to approximate statistics the total arrivals of coal for all Italy, Consul General David F. Wilber, Genoa reports, amounted in 1919 to 7,120,669 tons. The following figures give the total imports of coal into Italy for each year from 1910 to 1919:

|           | Tons       |
|-----------|------------|
| 1910..... | 8,428,115  |
| 1911..... | 9,595,832  |
| 1912..... | 10,057,228 |
| 1913..... | 10,873,608 |
| 1914..... | 9,722,813  |
| 1915..... | 8,348,176  |
| 1916..... | 8,065,041  |
| 1917..... | 5,283,723  |
| 1918..... | 6,718,871  |
| 1919..... | 7,120,659  |

The imports for 1918 and 1919, although showing an increase over those of 1917, were far below the minimum amount necessary for Italian industry as shown by the pre-war figures.

| Months         | England<br>Tons | United<br>States<br>Tons | France<br>Tons | Belgium<br>Tons | Totals<br>Tons |
|----------------|-----------------|--------------------------|----------------|-----------------|----------------|
| January.....   | 389,419         | .....                    | 32,772         | .....           | 422,191        |
| February.....  | 495,568         | 2,127                    | 9,294          | .....           | 503,989        |
| March.....     | 393,810         | 9,638                    | 9,990          | .....           | 413,438        |
| April.....     | 400,359         | 26,184                   | 39,592         | .....           | 466,135        |
| May.....       | 510,582         | 37,258                   | 71,898         | 18,817          | 635,555        |
| June.....      | 527,853         | 63,774                   | 12,910         | 17,957          | 622,524        |
| July.....      | 454,386         | 115,291                  | 4,460          | 12,573          | 586,710        |
| August.....    | 335,676         | 250,428                  | 21,951         | 21,526          | 629,581        |
| September..... | 362,119         | 346,195                  | 18,623         | 20,117          | 747,054        |
| October.....   | 266,280         | 510,099                  | .....          | 6,830           | 783,209        |
| November.....  | 448,530         | 329,359                  | .....          | 13,568          | 791,457        |
| December.....  | 491,721         | 18,451                   | .....          | 5,644           | 515,816        |
| Totals.....    | 5,076,303       | 1,705,804                | 221,520        | 117,032         | 7,120,659      |

<sup>a</sup> In these figures are included the shipments of coal from the Sarre (via Domodossola) and up to the month of August the coal imported by rail.

### Mexico's Annual Coal Output Amounts to 900,000 Tons

Coahuila is the only state in Mexico which produces coal. Normal production is about 900,000 tons a year, but at present only about half that quantity is obtained and none is exported. The shortage is supplied from the United States. Coal is not needed for heating purposes and charcoal is used for cooking.

### Imports of Coal at Rio Janeiro for First Quarter of 1920

Figures for arrival of coal at Rio de Janeiro during the months of January, February, and March, 1920, according to a report from the U. S. Bureau of Foreign and Domestic Commerce, are as follows:

| Month         | American<br>Coal,<br>Kilos | British<br>Coal,<br>Kilos | Total<br>Kilos |
|---------------|----------------------------|---------------------------|----------------|
| January.....  | .....                      | 34,102,319                | 34,103,319     |
| February..... | 38,386,151                 | 32,723,969                | 71,110,120     |
| March.....    | 26,928,543                 | 14,424,018                | 41,352,561     |
| Totals.....   | 65,314,694                 | 81,250,306                | 146,565,000    |

The preceding table shows the total imports of coal for all Italy for 1919 by months and countries of origin.

The decrease in the imports of American coal in December was due to the coal strike and consequent temporary prohibition of export.

According to the lists of the Commissariat General for Fuel, the prices for coal during 1919 were, per ton, as follows, in lire:

| Type          | Jan.  | May   | July | Sept. | Oct. | Nov.<br>5 | Nov.<br>15 |
|---------------|-------|-------|------|-------|------|-----------|------------|
| English.....  | 200   | 175   | 240  | 210   | 180  | 355       | 395        |
| French.....   | 180   | 160   | 210  | 240   | 250  | 290       | 350        |
| American..... | 210   | 270   | 330  | 340   | 380  | 420       | .....      |
| Belgian.....  | ..... | 240   | 270  | 280   | 355  | 395       | .....      |
| German.....   | ..... | ..... | 270  | 289   | 355  | 395       | .....      |

These prices, however, have been almost always exceeded in the sales made by private importers and dealers; especially for British coal.

### Output and Shipments of Australian Coal

A dispatch from Newcastle, Australia, says that during the month of April the total amount of coal mined was 166,000 tons, of which 64,300 tons were shipped overseas. This last amount does not include bunkers. There were 32,600 tons of coal supplied to overseas vessels for bunkers, the remaining number of tons being consumed in Australia. Freight rates to the west coast during April were 90s. per Norwegian vessel and 87s. 6d. per American vessel

### February Belgian Coal Output

According to a report by Consul General Henry H. Morgan, Brussels, Belgium's net production of coal during the month of February, the stocks up to March 1, 1920, as well as the average personnel employed in the pits and at the surface for each of the coal-mining districts and for the country in general, were as shown in the first table below.

The production diminished in February, 1920, compared with that of January, 1920, in five districts, and increased only in the Province of Namur. On the whole the decrease was 9.9 per cent of the January production, which is accounted for by the fact that in January there were 27 workdays and only 24 in February. Besides, there was a strike in the Borinage region and also in a part of the Centre, which affected production. Stocks diminished 93,517 tons during January.

To permit a comparison with the normal production the second table is given, showing the elements relative to the year 1913, which was not affected by any particular influence.

#### COAL PRODUCED IN BELGIUM, FEBRUARY, 1920

| Districts             | Net production for<br>February<br>Metric Tons | Stocks at<br>end of<br>February<br>Metric Tons | Average number of workers—<br>employed |         |         |
|-----------------------|---|--|--|---------|---------|
|                       |   |  | Pits                                   | Surface | Total   |
| Hainaut:              |   |  |  |         |         |
| Couchant de Mons..... | 311,690                                       | 59,410   | 26,765                                 | 10,200  | 36,965  |
| Centre.....           | 290,120                                       | 38,740   | 18,970                                 | 7,738   | 26,708  |
| Charleroi.....        | 602,530                                       | 229,390  | 33,432                                 | 17,330  | 50,762  |
| Namur.....            | 49,860  | 17,470   | 2,825                                  | 1,245   | 4,070   |
| Liege.....            | 412,750                                       | 50,980   | 27,866                                 | 10,948  | 38,814  |
| Limbourg.....         | 16,800  | 250  | 1,052                                  | 745     | 1,797   |
| Totals.....           | 1,683,750                                     | 398,240  | 110,910                                | 48,206  | 159,116 |

#### COAL PRODUCED IN BELGIUM IN 1913 AND 1920

| Provinces             | Average<br>monthly<br>production<br>in 1913 | Net<br>production<br>for<br>February<br>1920 | Percent-<br>age in<br>February<br>1920<br>compared<br>with 1913<br>Per Cent |
|-----------------------|---|--|---|
| Hainaut:              | Tons  | Tons   |   |
| Couchant de Mons..... | 364,200                                     | 311,960                                      | 85.6  |
| Centre.....           | 303,830                                     | 290,120                                      | 95.5  |
| Charleroi.....        | 679,000                                     | 602,530                                      | 88.7  |
| Namur.....            | 65,420                                      | 49,860                                       | 76.2  |
| Liege.....            | 498,260                                     | 412,750                                      | 82.8  |
| Limbourg.....         | .....                                       | 16,800                                       | .....   |
| Totals.....           | 1,910,710                                   | 1,683,750                                    | 88.1  |

## Coal Exported from the Port of New York During April

Shipments Are Larger Than for the Same Month of Three Preceding Years—Average Value of Anthracite Was \$10.71 Per Ton and That of Bituminous \$10.07

Export shipment of coal and coke through the Port of New York during April of this year totalled 13,305 tons, with a valuation of \$151,425. In April of 1917 the exports totalled 9,835 tons valued at \$72,987; in 1918, 10,825 tons valued at \$87,847, and last year there were 3,164 tons sent to foreign lands through the Port of New York which were valued at \$27,407.

The 9,637 tons of anthracite shipped from this port in April of this year were valued at \$103,298, an average cost of more than \$10.71 a ton, as compared with 1,695 tons shipped in the corresponding month of last year, valued at \$13,368, an average cost per ton of \$7.88 plus.

The average cost per ton of the 1,385 tons of bituminous sent abroad during last April was a trifle less than \$10.07 as compared with a little more than \$6.32 per ton in April of last year.

The 2,283 tons of coke shipped in April last cost \$34,167, an average of \$14.96 per ton, as compared with an average cost of more than \$16.47 per ton for the 468 tons exported in April of last year.

In 1917 the average price for anthracite sent abroad was \$6.36; for bituminous, \$10.37 and for coke \$13.65. The average cost in 1918 was anthracite \$7; bituminous \$6.91 and coke, \$26.47.

Shipments to the various countries, with the valuation, follow:—

|                   | Anthracite |          |       |           | Bituminous |         |       |          | Coke |         |       |          |
|-------------------|------------|----------|-------|-----------|------------|---------|-------|----------|------|---------|-------|----------|
|                   | 1919       | 1919     | 1920  | 1920      | 1920       | 1920    | 1920  | 1920     | 1919 | 1919    | 1920  | 1920     |
|                   | Tons       | Value    | Tons  | Value     | Tons       | Value   | Tons  | Value    | Tons | Value   | Tons  | Value    |
| Azores.....       |            |          | 25    | 557       |            |         |       |          |      |         |       |          |
| Barbados.....     |            |          |       |           |            |         |       |          |      |         |       |          |
| Canada.....       | 1,261      | \$9,954  | 2,904 | \$26,197  |            |         |       |          |      |         |       |          |
| Colombia.....     |            |          |       |           | 15         | \$260   |       |          | 18   | \$515   |       |          |
| Costa Rica.....   |            |          |       |           |            |         |       |          | 8    | 192     |       |          |
| Cuba.....         |            |          | 2,177 | 34,073    |            |         |       |          |      |         | 49    | \$1,147  |
| Ecuador.....      |            |          |       |           |            |         |       |          |      |         | 23    | 655      |
| Egypt.....        |            |          | 1,000 | 7,000     |            |         |       |          |      |         |       |          |
| France.....       |            |          |       |           |            |         |       |          | 395  | 5,600   | 2,174 | 32,000   |
| French W. I.....  |            |          | 2,852 | 28,520    |            |         |       |          | 8    | 206     | 3     | 90       |
| Italy.....        |            |          | 15    | 200       |            |         |       |          |      |         |       |          |
| Mexico.....       |            |          |       |           |            |         |       |          |      |         | 32    | 223      |
| Newfoundland..... | 404        | 3,234    | 100   | 1,250     |            |         |       |          |      |         |       |          |
| O. B. W. I.....   | 30         | 180      | 25    | 475       |            |         |       |          |      |         |       |          |
| Peru.....         |            |          |       |           |            |         |       |          | 33   | 1,043   |       |          |
| Port Africa.....  |            |          |       |           | 316        | 2,370   |       |          |      |         |       |          |
| Salvador.....     |            |          |       |           |            |         |       |          | 4    | 96      | 2     | 52       |
| San Domingo.....  |            |          | 487   | 4,261     | 670        | 3,698   | 10    | 200      |      |         |       |          |
| Uruguay.....      |            |          | 50    | 740       |            |         |       |          |      |         |       |          |
| Venezuela.....    |            |          | 2     | 25        |            |         | 3     | 40       | 2    | 59      |       |          |
| Totals.....       | 1,695      | \$13,368 | 9,637 | \$103,298 | 1,001      | \$6,328 | 1,385 | \$13,960 | 468  | \$7,711 | 2,283 | \$34,167 |

### British to Export 80,000 Tons of Coal Monthly to South America

Replying to a question in the House of Commons, W. C. Bridgeman, Parliamentary Secretary of the Board of Trade, said it was not proposed to prohibit the export of coal from the British Isles to South America. The quantity expected to be available for export to South America was approximately 80,000 tons monthly, and directions had been given that that amount might be released from the South Wales district.

### Belgian Coal Production Nears Pre-War Volume

Belgian coal production during the month of January reached 97.8 per cent of that month's output in 1913, according to figures of the Mining Administration. This is the percentage for the total production of the kingdom. As to different districts, the percentage in January for the district of Mons was 118 per cent, compared with 1913; that of the Centre district 101.8 per cent, Charleroi 93.8 per cent, Liege 85.3 per cent and Namur 75.2 per cent. The total production in January, 1920, was 1,869,635 metric tons, or 321,000 tons

more than in December, 1919, which month, however, was seriously affected by the strike in Hainaut.

### Output of Roumanian Coal Mines Is Inadequate

Roumanian coal mines, according to compilations by the Near East division of the U. S. Bureau of Foreign and Domestic Commerce, are not producing sufficient coal to meet the requirements of the railways. The decreasing output is reported to be caused chiefly by lack of labor and mining tools, together with the destruction caused by the Germans who mined the coal without consolidat-

ing the mine shafts. It has been suggested, says the Near East, that experienced miners be brought from Germany to overcome this condition, as the local workmen are not professional miners. The railway management has been requested to furnish wagons for the transport of coal dust in order to correct the present congestion at the pit-head. It is said that the monthly production will be raised from 14,000 tons to 23,000 tons.

### Swiss Fuel Imports Still Lag

A report on the foreign trade of Switzerland for 1919 by Trade Commissioner H. Lawrence Groves, Zurich, gives imports of coal as 1,258,176 metric tons, compared with 1,158,508 metric tons in 1918 and 1,969,454 metric tons in 1913. Imports of coke amounted to 191,415 metric tons in 1919, 673,853 metric tons in 1918 and 439,495 metric tons in 1913; briquets of all kinds, 281,295 metric tons in 1919, 288,778 metric tons in 1918 and 968,530 metric tons in 1913.

### Coal Imports of Austrian Republic

According to data compiled by the research division of the U. S. Bureau of Foreign and Domestic Commerce imports by the Republic of Austria for the eight months ending October, 1919, included the following (in metric tons): Coal, 1,037,270; brown coal, 500,602; coke, 107,566; briquets, 10,621.

### Coal Being Discharged Quickly at Italian Ports

Statistics supplied by the Ministry of Transportation in Rome to the Italian Government Commission in New York, gives an idea of the excellent situation prevailing at Italian ports, as can be seen from the quick discharge of coal in different ports during the month of May, 1920, by steamers controlled by the Italian Government.

#### DAILY AVERAGE RATE OF DISCHARGE OF COAL AT ITALIAN PORTS

| (In Metric Tons)      |       |               |       |
|-----------------------|-------|---------------|-------|
| Leghorn.....          | 1,127 | Savona.....   | 1,005 |
| Naples.....           | 1,066 | Brindisi..... | 970   |
| Civitavecchia.....    | 1,062 | Genoa.....    | 886   |
| Palermo.....          | 1,060 | Ancona.....   | 845   |
| Torre Annunziata..... | 1,032 | Venice.....   | 784   |

For all the above ports the daily average discharge was 950 metric tons.

### Coal Production in South Africa During March, 1920\*

| (NET TONS)                 |                             |             |                    |  |                       |                                   |                                  |
|----------------------------|-----------------------------|-------------|--------------------|--|-----------------------|-----------------------------------|----------------------------------|
| Province                   | No. of Collieries Producing | Mined, Tons | Waste Sorted, Tons | Percentage of Waste Sorted to Tons Mined | Total Coal Sold, Tons | Total Value Realized at Pit Mouth | Value per Ton at Pit Mouth s. d. |
| Transvaal.....             | 35                          | 703,201     | 73,306             | 10.42                                    | 604,473               | £170,737                          | 5 7.79                           |
| Springs-Brakpan Area.....  | 5                           | 61,187      | 9,875              | 16.14                                    | 47,870                | 113,163                           | 5 5.99                           |
| Middleburg Area.....       | 19                          | 545,449     | 55,215             | 10.12                                    | 473,930               | 36,278                            | 5 9.01                           |
| Other Areas.....           | 11                          | 96,565      | 8,216              | 8.51                                     | 82,673                | 21,296                            | 5 1.82                           |
| Cape.....                  | 5                           | 777         | 83                 | 10.68                                    | 695                   | 561                               | 16 1.73                          |
| Orange Free State.....     | 4                           | 87,252      | 2,923              | 3.35                                     | 79,286                | 22,737                            | 5 8.83                           |
| Natal.....                 | 27                          | 390,861     | 71,459             | 18.28                                    | 306,506               | 180,971                           | 11 9.70                          |
| Union of South Africa..... | 71                          | 1,182,091   | 147,771            |  | 990,960               | 375,006                           |                                  |

\*Yearly production 1910-1919 inclusive and for January and February, 1920, was printed in Coal Age May 27, 1920.

## Coal Operator Insures Lives of Underground Workers

AT its own expense, G. B. Markle Co. has insured until further notice the life of every underground coal mine worker in its employ, including underground foremen. This insurance, which is effective June 1, 1920, does not take the place of compensation benefits, which will be continued as prescribed by the Pennsylvania State law. This insurance covers death from accident in the mines or away from the mines, and also death from sickness or disease. It is also payable during the lifetime of the insured in regular installments in case he becomes permanently and totally disabled by accident or disease.

The amount of the insurance increases yearly according to the following schedule of continuous employment: In the first year, \$500; second year, \$600; third year, \$700; fourth year, \$800; fifth year, \$900; sixth year, \$1,000.

## Celebrate Edward Caldwell's Thirty Years in Technical Publishing

ON TUESDAY evening, June 15, the business associates of Edward Caldwell, treasurer of the McGraw-Hill Co., publisher of *Coal Age*, and the McGraw-Hill Book Co., tendered him a dinner at the Engineers' Club to commemorate his thirty years of service with these companies. Mr. Caldwell became assistant editor of the *Electrical World* on June 15, 1890, at which time Dr. Louis Bell was editor.

In June, 1894, Mr. Caldwell became business manager for the *Street Railway Journal*, the predecessor of the *Electric Railway Journal*, and he continued in this work until January, 1897, when he became associated with Hugh J. Grant, former Mayor of New York City, in street-car advertising. In January, 1899, he returned to the McGraw Publishing Co. and took charge of the book department.

Two years ago Mr. Caldwell became treasurer of the McGraw-Hill Co., at the same time retaining his connection with the book company.

Mr. Caldwell has always kept closely in touch with electrical engineering progress, and for many years has been a member of the American Institute of Electrical Engineers.

## Transatlantic Liner Returns to Service Equipped to Use Oil Fuel

AFTER an absence of nearly a year, during which time the vessel has been reconditioned throughout, the White Star liner *Olympic* will re-enter the passenger service between New York, Cherbourg and Southampton fitted for the consumption of oil fuel—the largest steamer in the world so equipped.

The selection of oil fuel as a motive power for this steamer was made after exhaustive tests. The operation of converting the *Olympic's* 195 furnaces from coal to oil fuel to provide steam in the twenty-nine boilers was a huge undertaking, 4,000 men having been employed for several months installing special machinery for this purpose.

The oil-carrying capacity of the ship is estimated at 50,000 barrels, which will be stored in the cellular compartments between the ship's double bottoms. The steamer will require about 25,000 barrels on each voy-

age, the quantity varying slightly according to speed. The International Mercantile Marine Co. is reported to have negotiated contracts recently for large deliveries of fuel oil for all its oil-burning steamers, including the *Olympic*. The installation of oil, which is loaded by gravity or pumped from tankers, is expected to eliminate delays heretofore caused by bad weather and other unusual conditions, which frequently interfered with coal loading, and also will eliminate dust and cinders on the deck. The oil is blown in a fine spray under each furnace, and cleaning out of the furnaces, which had to be done regularly when coal was used, will no longer be necessary.

## Members Appointed to Council of National Defense

DR. F. G. COTTRELL, director of the Bureau of Mines of the Department of the Interior, was appointed by Secretary John Barton Payne to represent him on the interdepartmental defense board of the Council of National Defense. Dr. Cottrell will succeed Dr. Van H. Manning, who served on the board from its creation until he resigned from the Government service to become technical director of the division of research of the American Petroleum Institute.

Ethelbert Stewart, of the conciliation division of the Department of Labor, has been appointed by Secretary William B. Wilson to represent him on the same board. Mr. Stewart will succeed Dr. Royal H. Meeker, chief of the Bureau of Labor Statistics.

These are the first changes in personnel on the interdepartmental defense board since its creation. The director of the council, Herbert N. Shenton, who is chairman of the board, stated that the activities of the council were so urgent that it probably will be necessary for the board to continue to meet each Wednesday morning during the summer.

The board with its newly elected members met June 23 to consider a preliminary report on the bituminous-coal industry which is being prepared by the council in co-operation with the U. S. Bituminous Coal Commission, the U. S. Geological Survey and various other Government agencies.

## Bureau of Mines Coal Laboratory To Be Moved to Pittsburgh

THE Bureau of Mines is moving its fuel-testing laboratories from Washington to Pittsburgh, where they will be consolidated with the work done in the latter location. This is a move in the general program of the bureau to have all of the executive offices in Washington but the laboratory work in the field stations.

The laboratories which are to be moved are the development of the old U. S. Geological Survey technological branch, which was transferred to the Bureau of Mines when the latter institution was formed some years ago. This laboratory has been handling the routine testing of about three hundred to five hundred coal samples per month for proximate analysis and B.t.u. determination. The research work on coal testing, all ultimate analyses and the overload of routine work have been done at Pittsburgh for some time. This change merely brings together all parts of the coal testing.

## Anthracite Mine Workers' Argument for a Larger Wage Presented by Jett Lauck

By Going Back to 1881 Lauck Attempts to Show Anthracite Mines Run Less Steadily than Bituminous — He Presents Figures to Prove Hard-Coal Mine Workers Are Paid Less Than Soft and Argues They Should Be Paid More

THE meetings of the Anthracite Wage Commission recommenced on Monday, June 28, after an adjournment from the previous Thursday. W. Jett Lauck, statistician for the United Mine Workers of America, was ready to present testimony on behalf of the mine workers, the information including twenty-one exhibits. The first fourteen related to wages and the establishment of a living wage, while the last seven related to the profits made by the operators.

Mr. Warriner for the latter objected to the presentation of the last seven exhibits as immaterial and not dealing with the issue before the commission. Dr. Thompson, the chairman, took these exhibits under advisement and said the commission would hear arguments later as to whether or not the exhibits as to profits should be presented.

Mr. Lauck then resumed his testimony and commenced the presentation of the exhibits to the commission. On the Thursday preceding this session the mine workers had presented two exhibits showing the wages actually received by the employees and so Mr. Lauck presented his first exhibit as No. 3. It will be noted that the twenty-one exhibits mentioned above do not correspond to the number of the exhibits as presented in this article, for a number of supporting papers and books were introduced and they were consecutively numbered with the twenty-one exhibits.

### PRESENTS ARGUMENT FROM A PAST CONDITION

Exhibit No. 3 shows the "Irregularity of Employment in the Anthracite Industry." It declares that the average number of days employed was 212 in the period 1881 to 1919, whereas the Pennsylvania bituminous mines worked 229 days and the bituminous mines throughout the United States averaged 216 days in the same period. In other words, Jett Lauck would try to show that the anthracite workers have not had the same opportunity to work that the bituminous workers have had and that if it had not been for the war period this discrepancy would have been greater. He argues in his exhibit that during the last few years the increase in employment was due to labor shortage and war conditions.

Exhibit No. 4 shows "Comparison of Earnings and Wage Rates in the Anthracite and the Bituminous Mines of Pennsylvania." In a table it shows that the average earnings for all employees of the anthracite field were less than the earnings for the bituminous fields during the period 1903 to 1919. Then it goes to show by separate occupations that the individual wages of the bituminous workers are class by class higher than the wages for the anthracite workers class by class. Mr. Lauck asserts that the anthracite industry is a more skilled industry than the bituminous and that the wages of the anthracite miners should be at least equal to, if they do not exceed, those of bituminous miners.

Exhibit No. 5 discusses the "Average Full-Time Weekly Earnings in the Anthracite Coal Mines of Penn-

sylvania." This exhibit is an amplification of the previous one and with those following up to No. 12 makes comparisons in the costs of living and wages in different localities. These exhibits will therefore be listed with little comment.

Exhibit No. 6 is entitled "Wage Rates in New York, Philadelphia, Pittsburgh and Buffalo." It makes comparison of the wages paid in several industries conducted in those cities. Exhibit No. 7 covers "Wages in Various Industries and Occupations, 1914 to 1920," and exhibit No. 8, "The Changes in Cost of Living and Prices." This shows that the cost of living since 1914 has increased 104 per cent.

Exhibit No. 9 argues that there is an "Improbability of Any Decrease in Prices and Cost of Living," while exhibit No. 10 confines itself to "Food Prices, Scranton, Pa." This exhibit and that numbered eight show that as regards high prices Scranton ranked fifteenth in the cities and shipbuilding centers of the United States. The latter are unfavorably distinguished by the high cost of living that obtains in them.

Exhibit No. 11 is entitled "Income and Expenditures in the Families of Anthracite Mine Workers," the succeeding exhibit, No. 12, discussing "The Relationship Between Rates of Pay and Earnings and the Cost of Living in the Anthracite Industry of Pennsylvania." It declares that the rate of pay of the contract miner had increased 81.3 per cent since 1902 and from 1914 49.8 per cent, but that since 1914 the increase in the cost of living had amounted to 104 per cent and the miners had been compelled to stand the difference.

### STEADIER WORK HAD SUPPLEMENTED ADVANCE

A diagram was presented which shows this graphically. S. D. Warriner and O. F. Huber made objections to this table, asserting that it did not show the exact conditions, for they said that the miner and the laborer had been given sufficient extra work to enable them to make up for this deficit. Mr. Lauck claimed that the men should not be forced to make up any such deficit by additional work.

Exhibit No. 13 is entitled "The Sanction for a Living Wage." This exhibit is divided into two parts, the first being headed "The verdict against the old theory of wages; against the determination of rates of pay through the alleged unhampered forces of supply and demand." This is supported by a number of quotations from various speeches and books. Among those quoted are "What Happened to Europe," by Frank A. Vanderlip; I. M. Rubinow's "The Trend in Real Wages," and "Sociology and the Modern Social Problems," by Charles A. Elwood.

The second part of this exhibit is entitled "The Living Wage." It quotes extensively from speeches, books and reports made by official organizations and agencies in the United States; it gives legislative enactments, state, national and international, favoring the principles enunciated; it quotes court decisions and arbitration

awards and the opinions of public men and women; the statements of economists and men of leading in the church, the joint agreements of capital and labor, the declarations of employers, of organized labor and the planks in political party platforms.

NOT "WHY A LIVING WAGE?" BUT "WHAT IS A LIVING WAGE?"

Mr. Warriner and Mr. Lauck both called attention to the fact that both sides of this controversy were agreed that labor was entitled to a living wage, but the point to be brought out was, "What is a living wage?" Mr. Lauck said this exhibit was presented for the information of the commission and not as meeting any existing controversy as to the right of the working man in the mines to receive a living wage.

Exhibit No. 14 was entitled "What Happened to Europe," by Frank A. Vanderlip. This exhibit and all of the following up to No. 18 were books or pamphlets enlarging on exhibit No. 13. For this reason the titles of these exhibits will be given and no remarks made upon them. They are: Exhibit No. 15, "Report Immigration Commission, Vol. 16"; exhibit No. 16, "Working Men's Standard of Living, Philadelphia"; exhibit No. 17, "The Living Wage," by Father Ryan.

"SECONDARY WAGE DEPENDING ON CAPACITY"

It is interesting to note a quotation which found place in exhibit No. 13. It is headed "Conclusions Reached by a Group of Twenty British Quaker Employers; from the Survey, Nov. 23, 1918." It runs: "The principle is held down that a minimum or basic wage should be established in every industry and that there should be a secondary wage depending upon the capacity of the worker." It seems rather unusual that a labor union should use the latter part of this quotation in one of its exhibits, as it has been in general opposed to payment for ability and results in any form, but this quotation was particularly noted by Mr. Lauck.

The commission adjourned at 4 p.m. on Monday and reassembled the following morning at 10 o'clock when Mr. Lauck resumed his presentation of exhibits to the commission. The three of these were: Exhibit No. 18, "Standard of Living" (budgetary studies); exhibit No. 19, "Cost of Living in a Coal Town"; exhibit No. 20, "What a Living Wage Should Be." The mine workers quote with great zest this last exhibit, which purports to show what a living wage should cover, and what is the cost of maintaining a family of five in Washington. It is a report made for the U. S. Bureau of Labor Statistics.

WHAT IS A FAIR BASIS OF DECENT LIVING?

The budget gives the minimum wage needed to support a government employee and his family if the following items are to be supplied: 1. A sufficiency of nourishing food for the maintenance of health, particularly of the health of children. 2. Housing in low-rent neighborhoods and with the smallest possible number of rooms consistent with decency, but with sufficient light, heat and toilet facilities for the maintenance of health and self-respect. 3. The upkeep of household equipment, such as kitchen utensils, bedding and linen, necessary for health, but no provision for the purchase of additional furniture. 4. Clothing sufficient for warmth, of a sufficiently good quality to be economical, but with no further regard for appearance and style than is necessary to permit the family members to appear in public and in their narrow social circles without

slovenliness or loss of self-respect. 5. A surplus over the above expenditures which would permit of only a minimum outlay for such necessary demands as: a. Street-car fares to and from work and necessary rides to stores and markets. b. The keeping up of a modest amount of insurance. c. Medical and dental care. d. Contributions to churches and labor or beneficial organizations. e. Simple amusements, such as moving pictures once in a while, occasional street-car rides for pleasure, some Christmas gifts for the children, etc. f. Daily newspaper.

Mr. Lauck elaborated on this budget at some length, explaining just what each item covered. In this same exhibit were presented a list of other budgets that had been prepared by various individuals and organizations and these were brought up to date by increasing the amounts by the percentage of increase in the cost of living since they were prepared. These budgets were based on provision of a bare subsistence level and on one assuring, at least, a minimum of comfort to the persons affected. The average for the minimum-comfort level was stated as approximately about \$2,200 a year for a family of five.

SIX DOLLARS A DAY LESS THAN \$2,200 A YEAR

Mr. Lauck then pointed out that the minimum wage that the United Mine Workers demanded was extremely reasonable as all they sought was a lower limit of \$6 per day, which, based on a working year of 300 days, made a minimum wage of only \$1,800 per year, or \$400 less than the minimum-wage level. Mr. Lauck also pointed out the fact that the anthracite mine workers at no time had received a working year of 300 days, that during 1919 the men had worked only about 252 days. This fact was disputed by the operators.

Mr. Warriner tried to establish the fact that if there was an increase in wages it would have a tendency to increase the cost of living and that if it did the minimum living wage that had been provided for would not then be sufficient and the case would be in the same position that it was at present. Mr. Lauck would not agree to that argument, declaring that he thought that prices would not advance with an increase of wages.

CAN A LIVING WAGE BE SET ARBITRARILY?

In further support of the need of a living wage Mr. Lauck presented exhibit No. 21, "Practicability of a Living Wage." Mr. Warriner inquired whether at any time wages had actually been fixed in accord with the studies referred to. Mr. Lauck answered this by pointing out that a minimum wage had been set to conform with the budget in the case of the street cleaners in New York and the employees of the Seattle and Tacoma street railways and also by the Bituminous Coal Commission.

Exhibit No. 22 was "The Trade Union as the Basis for Collective Bargaining." This exhibit caused more discussion than all the preceding ones together, and at times the temperature of the room notably rose. Up until this time the proceedings had been rather slow and uninteresting but the injection of this matter much enlivened the session.

Mr. Lauck endeavored to show that the trade union was the proper vehicle to make a collective bargain and in support of this presented numerous quotations and the experiences of many persons and associations. The exhibit is divided into nineteen parts: Statesmen (including Wilson, Roosevelt, Taft, Hughes and Hoover);

the church, the government, the law, the national agreement, the organized employer, historians, economists, social scientists, journalists, the peace treaty, the Republican platform, the employer, the President's First Industrial Conference, the American Federation of Labor, the Industrial Workers of the World, the war and labor, foreign recognition and the growth of unionism. After Jett Lauck had completed the reading of numerous extracts from this exhibit Mr. Warriner requested that Mr. Lauck state whether he was trying to demonstrate any other point than the fact that collective bargaining was good in itself but that it was better when taken in connection with the labor union.

#### ARGUMENT ON UNION RECOGNITION GREW WARM

Then the argument started and at times became warm. Mr. Warriner wanted to know if Mr. Lauck did not approve of the collective bargaining that had been taking place in the anthracite field since 1902. Mr. Lauck stated that it was good but it would have been better if the operators had bargained with the United Mine Workers of America. Mr. Warriner then stated that the United Mine Workers had acted for the men. Mr. Murray and Mr. Dempsey took exception to this, declaring that the United Mine Workers had not acted for the men as a body, but as individuals posing as representatives of the Anthracite Coal Workers' Association, which was really a non-existent organization. They declared that the mine operators would not deal with the United Mine Workers of America.

The United Mine Workers had assumed the burden of the contract that had been made between the non-existing body of the Anthracite Coal Workers' Association and had seen that it was complied with, but now, after eighteen years of carrying out an agreement in the name of a body not existing, the United Mine Workers felt that they should be recognized and be allowed the check-off and the closed shop. Mr. Warriner declared that Mr. Mitchell, formerly president of the United Mine Workers of America, had signed the contracts in that capacity, but Messrs. Dempsey, Murray and Kennedy took exception, asserting that Mr. Mitchell did not sign for the United Mine Workers of America but as representing, through the board of conciliation, the imaginary Anthracite Coal Workers' Association.

Further, Mr. Kennedy averred that if the United Mine Workers had lived up to the contracts that had been signed in the past the board of conciliation for the anthracite region would have gone out of existence a number of times, as in many cases a majority of the mine workers were not members of the association, which fact annulled the agreement for the board of conciliation.

#### ANOTHER TOO BUSY CHAIRMAN MUST GO EARLY

As 4 p.m. was approaching the chairman of the commission called a halt in the proceedings, it being his intention to leave on the 5 p.m. train for Ohio. In consequence Mr. Lauck presented exhibits 23 to 26 without any comment, thus affording the operators in the period prior to the re-assembling of the commission, Wednesday, July 7, a chance to study the documents and prepare their reply.

Two of the exhibits just mentioned were: Exhibit No. 23, "The Report of the Anthracite Coal Commission for 1902," and Exhibit No. 24, "The Sanction for the Eight-Hour Day." The latter exhibit covers 87 pages

and contains the opinions of many individuals as to the reason for upholding the eight-hour day. It starts with a discussion of the trend toward that length of work per day in the United States and foreign countries.

Then it discusses the eight-hour day and its relation to output, and tries to show that a greater output is attained with the eight-hour day than with longer hours and gives actual figures to prove it, these figures being compiled from fifteen sources. The eight-hour day is considered also from its social side. The results of a study of the short working day in English coal mines are then shown and the exhibit is concluded by general statements, recommendations and decisions on the shorter working day.

#### DILATE ON HAZARDS OF ANTHRACITE MINING

The other exhibits were: Exhibit No. 25, "A Brief by Justice Brandeis, U. S. Supreme Court, on the Shorter Work Day," and exhibit No. 26, "Occupation Hazard of Anthracite Miners." In this exhibit it is shown that anthracite mining is a hazardous occupation and eleven conclusions are reached:

(1) A prominent authority states, "Probably no industry is so subject to exceptional hazards as the coal industry." (2) The general mortality of the anthracite miner is distinctly above the average for all occupied males. (3) A large and representative insurance company will accept miners only if they pay rates such as are required of normal individuals who are sixteen years older than the insuring miner and even then it will permit them to have no cheaper form of policy than a twenty-year endowment. Only one other occupation is subject to more drastic conditions. (4) The director of the U. S. Bureau of Mines stated, "The hazard of coal mining is undoubtedly on the increase." (5) The latest anthracite report of the Pennsylvania Department of Mines states that in spite of increased inspections there has been no decrease in the fatalities about the mines. (6) A bulletin of the U. S. Bureau of Labor Statistics states, "Throughout every year of the working period of life the mortality of coal miners includes a relatively much higher proportion of deaths from accidents than is found to prevail among all occupied males." The State Insurance Department of Pennsylvania found that anthracite mining had the highest accident rating of all industries under the Compensation Act, with but one exception, viz., iron construction. (7) The personal-accident insurance companies impose strict limitations on the occupation of coal miner and will grant only a minimum amount of insurance. For the same money, printers and machinists are given five and six times as much insurance protection as is afforded the coal miner. (8) The leading causes of death are respiratory diseases and industrial accidents. (9) The non-fatal accidents in the Pennsylvania anthracite field in 1916 disabled about one-sixth of the entire working force for a greater or less period. The report of the Pennsylvania State Health Insurance Commission states that "the total sickness rate among miners was 8 per cent higher than the general rate for white adult males." (10) Where the injury did not cause death, it most frequently caused disability in the arms and legs, resulting on recovery in an inability to resume mine work. (11) The report of the Pennsylvania State Commission on Old Age Pensions states, "Miners age prematurely." The balance of this exhibit elaborates on these points and explains them more fully.

# NEWS FROM

# THE CAPITOL

BY PAUL

WOOTON



## To Confer on Prepayment of Freight on Coal for Canada

**P**REPAYMENT of freight charges on coal for Canada is to be the subject of a conference in the near future. The Interstate Commerce Commission has designated Commissioner Hall to make the necessary arrangements for a meeting of those concerned in this matter. The date has not been set, but it is expected that the conference will be held this week.

## Make Application for Water Power Before Commission Is Perfected

**T**HE Federal Power Commission, which will administer the new Water-Power Act, has received applications for more than 500,000 hp., despite the fact that the commission's machinery has not been established.

The President has designated Secretary Baker as chairman of the commission. The other members are Secretaries Payne and Meredith. They are expected to name the executive secretary during the week of July 12. It is understood that O. C. Merrill, the chief engineer of the forest service, has been agreed upon for the position.

## Technicalities Delay Purchase of Needed Railroad Equipment

**D**IFFICULTIES have been encountered which have prevented any portion of the railroads' revolving fund being used in the purchase of new equipment. Of the \$300,000,000 of the revolving fund, \$125,000,000 was apportioned for the purchase of equipment. It now develops that the Treasury cannot accept equipment notes. Under the present practice it would be necessary to have the amount covered by first mortgage funds. In the case of the railroads, however, this is impossible. There are first, second and third mortgages outstanding against most railroads. It may be that the permission of all bondholders will have to be secured before security acceptable to the Treasury Department can be issued.

## Shift in Demand for Coal Held Responsible For Trouble

**D**ISINTERESTED coal specialists in the service of the Government attach great importance, in analyzing the coal situation, to the readjustment of distribution which has been made necessary by the changed conditions which have grown out of the war. The coal industry is called upon to lay down at tidewater 10,000,000 or 15,000,000 more tons than ever has been the case before. Even before the increase in exports

the demand for coal in the East and the difficulties of transportation were reducing the quantities of west-bound coal.

Under present conditions there is a strong tendency to give up Lake business so that more coal can be sent East. It is believed that this tendency will increase and that it will be left more and more to Illinois and Indiana to supply the Northwest. New England is certain to suffer in the same way, although it is fully recognized that New England has a prior lien on 21,000,000 tons of coal a year. Not more than 10,000,000 of that amount can move by rail without interfering too severely with the use of the railroads for distributing New England's manufactured products. As a result 11,000,000 tons of New England's coal must move by tidewater in normal years.

These same specialists point to the labor troubles on the railroads as the basic cause of insufficient coal production and suggested that if those interested would bring the same amount of pressure to bear on the Railroad Labor Board as has been brought against the Interstate Commerce Commission, they would be striking closer to the seat of the present trouble with coal.

## Assigned Cars Are Ordered by I. C. C. for Public Utility

**Y**IELDING to the insistence of public utility companies, the Interstate Commerce Commission on June 30 issued Service Order No. 8, which gives a priority to the Philadelphia Electric Co. for 12,000 tons of coal. That the commission will be called upon to issue a very large number of similar orders is not doubted.

The order is unique for today, in that it is for the benefit of an individual shipper. It gives the impression that the commission has gone beyond the law which provides for dealing with the carriers' business. It reopens the many difficult questions which confronted the Priorities Board during the war. Such a policy will require differentiation between essential and non-essential industries and it is predicted that several additional acres of office floor space will be required to house the employees who will be necessary if the practice is continued.

The order is as follows:

It appearing, in the opinion of the Interstate Commerce Commission that because of a shortage of equipment and congestion of traffic, aggravated by unfavorable labor conditions which exist upon the lines of the Pennsylvania Railroad Co. and the East Broad Top Railroad & Coal Co., each of which is a common carrier by railroad subject to the Interstate Commerce Act, an emergency exists which requires immediate action with respect to the transportation of bituminous coal for the Philadelphia Electric Co., a public utility which operates lighting and electric power systems

of the city of Philadelphia, Pa., upon the continued operation of which depends the peace, health and welfare of the people of that city;

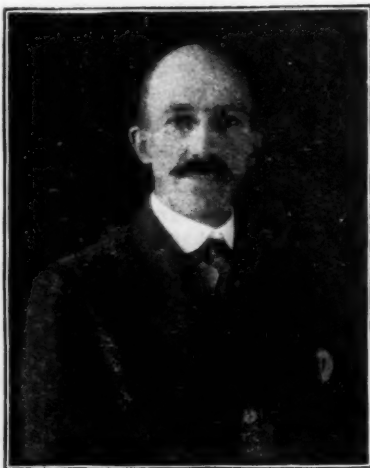
It further appearing that the said Philadelphia Electric Co. has not a sufficient supply of coal with which to continue the operation of the lighting and electric power system in Philadelphia and may shortly be obliged to cease and discontinue such operation unless immediate relief is afforded in the transportation to it of bituminous coal:

It is ordered that the Pennsylvania Railroad Co. and the East Broad Top Railroad & Coal Co. be, and they are hereby, authorized and directed to assign cars to the Rock Hill Coal & Iron Co. for the transportation by said common carriers of approximately 12,000 tons of bituminous coal now above ground to be shipped by that company from Orbisonia, Pa., to the Philadelphia Electric Co., Philadelphia, Pa., at the rate of twenty cars per day for twelve consecutive working days beginning with July 1, 1920, excluding Sundays and legal holidays, in addition to and without regard to the existing ratings and distributive shares for the mines upon said railroads.

It is further ordered that all rules, regulations and practices of said common carriers by railroad with respect to car service are hereby suspended insofar only as conflicting with the directions hereby made.

### E. A. Holbrook Appointed Assistant Director Of Bureau of Mines

**ELMER ALLEN HOLBROOK** has been appointed assistant director of the Bureau of Mines. He succeeds Dr. F. G. Cottrell, who recently became director of the bureau. Mr. Holbrook was born at Pittsfield, Mass., forty years ago. His early education was obtained at the public schools of that place. His higher education was secured at the Massachusetts Institute of Technology, from which institution he was graduated in 1904, after having completed his course in mining engineering. Prior to his graduation from the Institute he worked in mines in Montana and was a member of one of the locals of the Western Federation of Miners.



Mr. Holbrook's first position after leaving college was with the Standard Ore Co. in Montana, where he served as a sampler and underground surveyor. His next position was as superintendent of Ruby Gulch Mining Co. at Zortman, Mont. Later he served in the same capacity for the Gould Mines Co. at Gould, Mont. In 1907 he was made general superintendent of the Daly Reduction Co. at Hedley, British Columbia. At that time the Daly Co. was the largest producer of gold in the Dominion of Canada. After three years with this company Mr. Holbrook began a general practice as an examining engineer. He reported on properties in Nevada, South Dakota, Georgia, Ontario and Quebec, and was engaged for a time at Guanajuato, Mexico.

In 1911 he established headquarters at Halifax, Nova Scotia, where he designed and erected the mining laboratory for the Department of Technical Education

of the Province of Nova Scotia. During the three years he was at Halifax he did a general engineering practice, most of which was in coal mines. For a time he was in charge of the mining department of the Nova Scotia Technical College.

In 1913 Mr. Holbrook joined the staff of the University of Illinois as associate professor in the mining department. Two years later he was raised to the rank of professor in the same department. During the several years he was associated with the University of Illinois he carried out important engineering and investigational work in the coal mines of the Middle West. In 1917 he was made supervising mining engineer of the Bureau of Mines and was placed in charge of the Middle West coal field station at Urbana, Ill.

### Stocks of Bituminous Coal

**AT THE** request of the U. S. Bituminous Coal Commission, and largely with the help of funds provided by the commission, the Geological Survey, under the direction of F. G. Tryon, has conducted a rapid canvass of stocks of coal in the hands of representative consumers. Inquiries were sent out to a selected list of

#### STOCKS OF BITUMINOUS COAL ON HAND AT REPRESENTATIVE INDUSTRIAL PLANTS OTHER THAN STEEL AND BYPRODUCT PLANTS

Feb. 29 and May 31, 1920 (Net Tons)

| State                     | Number of Plants Reporting | Weekly Consumption, March to May, 1920 | Tons on Hand |           | Weeks' Supply on Hand (a)* |        |
|---------------------------|----------------------------|--|--------------|-----------|----------------------------|--------|
|                           |                            |  | Feb. 29      | May 31    | Feb. 29                    | May 31 |
| Maine.....                | 23                         | 14,745                                 | 87,291       | 93,457    | 5                          | 6      |
| New Hampshire.....        | 37                         | 7,725                                  | 60,712       | 38,416    | 7                          | 5      |
| Vermont.....              | 41                         | 2,184                                  | 16,203       | 13,642    | 7                          | 6      |
| Massachusetts.....        | 299                        | 51,265                                 | 312,068      | 267,555   | 6                          | 5      |
| Connecticut.....          | 84                         | 23,255                                 | 132,640      | 98,076    | 5                          | 4      |
| Rhode Island.....         | 66                         | 9,159                                  | 60,456       | 56,327    | 6                          | 6      |
| New York.....             | 161                        | 90,773                                 | 291,679      | 269,407   | 3                          | 3      |
| New Jersey.....           | 100                        | 42,936                                 | 203,946      | 204,139   | 4                          | 4      |
| Pennsylvania.....         | 125                        | 113,867                                | 290,026      | 315,911   | 2                          | 2      |
| Maryland.....             | 28                         | 12,448                                 | 35,209       | 29,678    | 2                          | 2      |
| Delaware.....             | 24                         | 3,918                                  | 20,949       | 26,674    | 5                          | 6      |
| District of Columbia..... | 11                         | 1,132                                  | 2,155        | 1,364     | 1                          | 1      |
| West Virginia.....        | 51                         | 21,407                                 | 39,462       | 41,239    | 1                          | 1      |
| Ohio.....                 | 140                        | 94,972                                 | 221,148      | 238,264   | 2                          | 2      |
| Indiana.....              | 105                        | 45,639                                 | 131,314      | 104,848   | 2                          | 2      |
| Illinois.....             | 148                        | 106,941                                | 313,145      | 248,059   | 2                          | 2      |
| Michigan (b).....         | 120                        | 120,992                                | 618,966      | 486,525   | 5                          | 4      |
| Wisconsin.....            | 96                         | 40,886                                 | 170,262      | 111,621   | 4                          | 2      |
| Minnesota (c).....        | 54                         | 18,417                                 | 145,091      | 92,436    | 7                          | 5      |
| Iowa.....                 | 32                         | 16,906                                 | 34,799       | 34,885    | 2                          | 2      |
| North Dakota.....         | 6                          | 524                                    | 1,160        | 989       | 2                          | 1      |
| South Dakota.....         | 4                          | 143                                    | 1,255        | 605       | 8                          | 4      |
| Nebraska.....             | 8                          | 4,864                                  | 14,431       | 12,405    | 3                          | 2      |
| Virginia.....             | 38                         | 11,225                                 | 28,574       | 41,678    | 2                          | 3      |
| North Carolina.....       | 52                         | 10,754                                 | 68,603       | 52,422    | 6                          | 4      |
| South Carolina.....       | 46                         | 4,231                                  | 28,055       | 32,211    | 6                          | 7      |
| Georgia.....              | 30                         | 3,514                                  | 25,803       | 16,780    | 7                          | 4      |
| Florida.....              | 13                         | 513                                    | 324          | 1,494     | 4                          | 2      |
| Kentucky.....             | 30                         | 7,336                                  | 17,404       | 17,303    | 2                          | 2      |
| Tennessee.....            | 68                         | 15,814                                 | 55,346       | 39,651    | 3                          | 2      |
| Alabama.....              | 38                         | 9,094                                  | 28,608       | 25,114    | 3                          | 2      |
| Mississippi.....          | 28                         | 1,104                                  | 6,798        | 5,274     | 6                          | 4      |
| Missouri.....             | 84                         | 31,930                                 | 108,291      | 86,401    | 3                          | 2      |
| Kansas.....               | 55                         | 15,144                                 | 47,250       | 49,633    | 3                          | 3      |
| Oklahoma.....             | 17                         | 3,654                                  | 31,016       | 33,795    | 8                          | 9      |
| Arkansas.....             | 24                         | 1,484                                  | 6,008        | 5,165     | 4                          | 3      |
| Louisiana.....            | 6                          | 136                                    | 1,065        | 1,385     | 7                          | 10     |
| Texas.....                | 56                         | 4,771                                  | 8,571        | 4,522     | 1                          | 1      |
| Colorado.....             | 35                         | 6,953                                  | 31,929       | 35,792    | 4                          | 5      |
| New Mexico.....           | 6                          | 2,708                                  | 14,072       | 22,890    | 5                          | 8      |
| Arizona.....              | 11                         | 2,160                                  | 15,825       | 16,482    | 7                          | 7      |
| Utah.....                 | 25                         | 7,923                                  | 34,817       | 18,840    | 4                          | 2      |
| Nevada.....               | 8                          | 3,842                                  | 16,650       | 11,921    | 4                          | 3      |
| Wyoming.....              | 3                          | 78                                     | 477          | 364       | 6                          | 4      |
| Montana.....              | 15                         | 11,492                                 | 64,580       | 70,264    | 5                          | 6      |
| Idaho.....                | 15                         | 732                                    | 3,434        | 2,516     | 4                          | 3      |
| Washington.....           | 13                         | 2,392                                  | 10,669       | 10,144    | 4                          | 4      |
| Oregon.....               | 7                          | 158                                    | 773          | 503       | 4                          | 3      |
| Grand totals.....         | 2,486                      | 1,004,240                              | 3,859,309    | 3,389,066 | 3                          | 3      |

\*Approximate.

(a) Calculated at average rate of consumption during March, April, and May 1920.

(b) Figures given include certain copper mines of Northern Peninsula. If the mines be eliminated the supply in hands of other consumers was 2 weeks on Feb. 29, and 3 weeks on May 31.

(c) Figures given include certain iron mines. If the mines be eliminated the supply in the hands of other consumers was 3 weeks on Feb. 29, and the same on May 31.

STOCKS OF GAS COAL ON HAND AT REPRESENTATIVE  
COAL-GAS PLANTS

Feb. 29 and May 31, 1920 (Net Tons)

| State                              | Number of<br>Plants Reporting | Weekly Con-<br>sumption, March<br>to May, 1920 | Tons on Hand |         | Weeks' Supply<br>on Hand* |        |
|------------------------------------|-------------------------------|--|--------------|---------|---------------------------|--------|
|                                    |                               |  | Feb. 29      | May 31  | Feb. 29                   | May 13 |
| Maine.....                         | 3                             | 901  | 10,059       | 9,417   | 11                        | 10     |
| New Hampshire.....                 | 9                             | 6,572  | 46,002       | 18,169  | 7                         | 2      |
| Massachusetts.....                 | 2                             | 4,097  | 30,247       | 24,283  | 7                         | 5      |
| Rhode Island.....                  | 2                             | 1,827  | 14,490       | 9,988   | 7                         | 5      |
| Connecticut.....                   | 2                             | 13,296   | 25,677       | 7,558   | 1                         |        |
| New York.....                      | 4                             | 144  | 486          | 201     | 3                         | 1      |
| New Jersey.....                    | 3                             | 3,879  | 15,360       | 19,930  | 3                         | 5      |
| Pennsylvania.....                  | 3                             | 198  | 637          | 427     | 3                         | 2      |
| Maryland.....                      | 5                             | 334  | 854          | 758     | 2                         | 2      |
| Ohio.....                          | 13                            | 2,434  | 15,960       | 10,846  | 6                         | 4      |
| Indiana.....                       | 12                            | 3,416  | 15,245       | 9,270   | 4                         | 2      |
| Illinois.....                      | 13                            | 12,995   | 50,632       | 49,620  | 3                         | 3      |
| Michigan.....                      | 6                             | 5,156  | 43,443       | 14,175  | 8                         | 2      |
| Wisconsin.....                     | 3                             | 1,941  | 3,732        | 942     | 2                         |        |
| Minnesota and North<br>Dakota..... | 5                             | 824  | 2,241        | 2,085   | 2                         | 2      |
| Iowa.....                          | 6                             | 2,208  | 1,846        | 2,794   |                           |        |
| Virginia.....                      | 5                             | 813  | 2,717        | 4,015   | 3                         | 4      |
| North Carolina.....                | 2                             | 271  | 857          | 472     | 3                         | 1      |
| South Carolina.....                | 3                             | 2,050  | 2,636        | 7,753   | 1                         | 3      |
| Georgia and Florida.....           | 4                             | 236  | 984          | 503     | 4                         | 2      |
| Kentucky.....                      | 3                             | 1,201  | 3,049        | 2,010   | 2                         | 1      |
| Tennessee.....                     | 4                             | 1,479  | 5,806        | 826     | 3                         |        |
| Alabama.....                       | 3                             | 470  | 1,559        | 1,522   | 3                         | 3      |
| Mississippi.....                   | 2                             | 112  | 874          | 539     | 7                         | 4      |
| Arkansas and Louisiana.....        | 2                             | 285  | 740          | 1,233   | 2                         | 4      |
| Texas.....                         | 2                             | 2,322  | 12,060       | 12,279  | 5                         | 5      |
| Colorado and Utah.....             | 5                             | 2,811  | 12,004       | 11,190  | 4                         | 4      |
| Idaho and Washington.....          |                               |  |              |         |                           |        |
| Grand totals.....                  | 126                           | 72,272   | 320,197      | 222,805 | 4                         | 3      |

\*Approximate.

consumers, most of them large, including byproduct coke ovens, iron and steel plants, other industrial consumers, coal-gas plants, electric public utilities, and retail coal dealers well scattered over the entire country.

Because of the limited time available it was impossible to secure figures from all of the ninety-odd thousand commercial consumers in the country. By addressing a limited list of about 5,500 plants it has been possible practically to complete the survey within a month. While a number of the consumers addressed have not yet furnished returns, the proportion received has been sufficient to justify the publication of preliminary figures for the gas and electric utilities and for industrial consumers other than steel and byproduct plants.

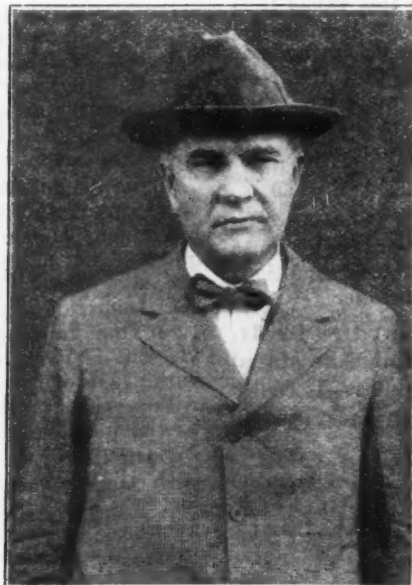
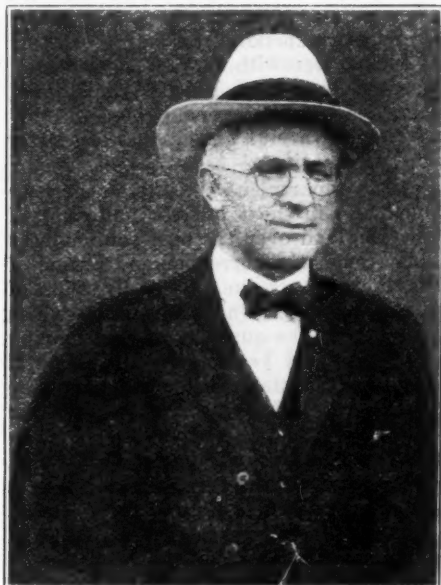
In examining the tables shown herewith it must be remembered that the figures of weeks' supply on hand are necessarily averages, and that the conditions at particular plants may depart widely from the average. Furthermore, the smaller the number of plants upon which the average is based, the greater becomes the chance that exceptional conditions at one plant may unduly influence the average.

STOCKS OF BITUMINOUS COAL ON HAND AT REPRESENTATIVE  
ELECTRIC UTILITY PLANTS

Feb. 29 and May 31, 1920 (Net Tons)

| State                            | Number of<br>Plants Reporting | Weekly Con-<br>sumption, March<br>to May, 1920 | Tons on Hand |           | Weeks' Supply<br>on Hand* |        |
|----------------------------------|-------------------------------|--|--------------|-----------|---------------------------|--------|
|                                  |                               |  | Feb. 29      | May 31    | Feb. 29                   | May 31 |
| Maine.....                       | 2                             | 120  | 789          | 1,021     | 6                         | 8      |
| New Hampshire.....               | 3                             | 1,224  | 3,654        | 3,475     | 3                         | 2      |
| Vermont.....                     | 3                             | 189  | 25           | 670       |                           |        |
| Massachusetts.....               | 12                            | 19,925   | 77,989       | 103,650   | 3                         | 5      |
| Connecticut.....                 | 9                             | 9,301  | 27,909       | 54,339    | 3                         | 5      |
| Rhode Island.....                | 4                             | 5,290  | 24,946       | 36,675    | 4                         | 7      |
| New York.....                    | 15                            | 48,150   | 154,174      | 139,556   | 3                         | 2      |
| New Jersey.....                  | 19                            | 19,236   | 43,895       | 65,227    | 2                         | 3      |
| Pennsylvania.....                | 18                            | 44,195   | 119,926      | 141,523   | 2                         | 3      |
| Maryland.....                    | 6                             | 5,722  | 27,446       | 30,855    | 4                         | 5      |
| Delaware.....                    | 2                             | 1,643  | 4,720        | 5,406     | 2                         | 3      |
| District of Columbia.....        | 2                             | 978  | 7,217        | 4,512     | 7                         | 4      |
| West Virginia.....               | 6                             | 5,685  | 6,054        | 19,630    | 1                         | 3      |
| Ohio.....                        | 25                            | 42,000   | 111,764      | 137,215   | 2                         | 3      |
| Indiana.....                     | 26                            | 23,077   | 74,836       | 47,644    | 3                         | 2      |
| Illinois.....                    | 20                            | 59,206   | 212,754      | 118,494   | 3                         | 2      |
| Michigan.....                    | 7                             | 17,591   | 42,018       | 109,398   | 2                         | 6      |
| Wisconsin.....                   | 8                             | 10,533   | 67,463       | 40,920    | 6                         | 3      |
| Minnesota.....                   | 6                             | 5,201  | 27,944       | 44,946    | 5                         | 8      |
| Iowa.....                        | 22                            | 12,963   | 46,557       | 38,796    | 3                         | 3      |
| North Dakota.....                | 5                             | 1,000  | 2,427        | 3,163     | 2                         | 3      |
| South Dakota.....                | 5                             | 457  | 3,090        | 3,197     | 6                         | 6      |
| Nebraska.....                    | 8                             | 5,090  | 16,006       | 11,819    | 3                         | 2      |
| Virginia.....                    | 8                             | 9,460  | 11,117       | 12,185    | 1                         | 1      |
| North Carolina.....              | 3                             | 461  | 4,337        | 2,922     | 9                         | 6      |
| South Carolina.....              | 6                             | 1,836  | 4,741        | 4,550     | 2                         | 2      |
| Georgia.....                     | 8                             | 1,985  | 11,584       | 10,727    | 5                         | 5      |
| Florida.....                     | 4                             | 403  | 2,500        | 3,158     | 6                         | 7      |
| Kentucky.....                    | 10                            | 5,683  | 18,976       | 11,550    | 3                         | 2      |
| Tennessee.....                   | 7                             | 5,223  | 10,277       | 11,619    | 1                         | 2      |
| Alabama and Mississippi.....     | 16                            | 5,031  | 42,635       | 50,251    | 8                         | 10     |
| Missouri.....                    | 5                             | 7,180  | 36,266       | 19,458    | 5                         | 2      |
| Kansas.....                      | 9                             | 5,514  | 24,992       | 20,140    | 4                         | 3      |
| Oklahoma.....                    | 6                             | 462  | 1,400        | 1,681     | 3                         | 3      |
| Arkansas.....                    | 6                             | 693  | 1,171        | 1,403     | 1                         | 2      |
| Louisiana.....                   | 3                             | 2,854  | 4,418        | 7,914     | 1                         | 2      |
| Texas.....                       | 6                             | 1,890  | 3,864        | 3,143     | 2                         | 1      |
| Colorado.....                    | 9                             | 6,984  | 12,902       | 13,710    | 1                         | 2      |
| New Mexico.....                  | 4                             | 521  | 1,903        | 2,245     | 3                         | 4      |
| Wyoming.....                     | 3                             | 1,157  | 1,734        | 2,393     | 1                         | 2      |
| Montana and Washing-<br>ton..... | 4                             | 2,543  | 21,948       | 31,700    | 8                         | 12     |
| Grand totals.....                | 350                           | 398,656  | 1,320,368    | 1,372,880 | 3                         | 3      |

\*Approximate.



Horgan, Scranton, Pa.

## Anthracite Wage Commission Appointed by President To Settle Hard-Coal Labor Matters

NEIL FERRY

Who represents on the Commission the United Mine Workers of America, or, as the operators would rather say, the Anthracite Coal Workers' Association

DR. W. O. THOMPSON

Chairman of the commission and president of Ohio State University, who was appointed to represent the interest which the public has in the controversy

W. L. CONNELL

At one time mayor of Scranton, president of the Connell Anthracite Mining Co., chairman of the Anthracite Conciliation Board, who will represent the operators

## Panic Created by New England Priority and Reckless Bidding

In Letter of Protest to Governors and I. C. C. Chairman W. H. Williams Scores Action of Executives

**P**ROTESTING against the action of the governors of New England States in appealing to the Interstate Commerce Commission for relief from the so-called coal shortage in those states, W. H. Williams, vice-president of the Delaware & Hudson Co., has written a letter to the governor of each of those states and also to Edgar E. Clark, chairman of the Interstate Commerce Commission, in which he says that the action of the state executives, together with the action of some of the larger manufacturers in bidding any kind of a price for coal, is creating a state of panic. Mr. Williams says this is a buyers' market. Addressing the governors of New England Mr. Williams on June 21, wrote:

We have gotten into a buyers' market, which originally started very largely through a desire of the people to get in a stock of coal in advance of an increase in freight rates, which it is believed will be anywhere from 25 per cent to 35 per cent.

While this is a practice which undoubtedly any business man would follow as a matter of economy, in this instance it has resulted in active competition for coal. This has in some measure disturbed the sources of supply of some people, and through a misunderstanding of the causes they have assumed it was due to the total coal produced being insufficient to meet current needs. I believe a review of the statistics will clearly show the contrary to be the fact.

The action of the governors of the New England States in making an appeal to the Interstate Commerce Commission and claiming an actual shortage in New England, together with the action of some of the larger manufacturers in bidding any kind of a price for coal, is creating a state of panic in the minds of the people rather than clarifying the situation and permitting of the matter being brought within proper lines.

From this it is not to be understood that I would contend that some of the cities in New England may not be in need of coal or that particular industries may not have experienced some shortage of coal. Where this exists it is due to one of your industries bidding against another and thereby securing a greater supply than is needed for current requirements. The fact remains, however, that the New England territory collectively has received more coal than was needed for current requirements, and it is this competition in buying that has disturbed the distribution of coal and, to some extent, seriously and adversely affected the price to the consumer.

I deem it most important that the facts themselves be assembled and so clearly presented to your people as to allay their needless alarm and permit of normal conditions being established at as early a date as possible.

Mr. Williams had already, on June 17, written to Mr. Clark his view of the coal situation, in which he stated that the country—New England in particular—is really much better off as regards supplies than most people realize. His letter follows:

I understand your commission now has before you the question of bituminous coal supply for this country, and in this connection I am endeavoring to prepare an analysis which I hope to send you within a couple of days.

Bulletin 144 of the Department of the Interior, U. S. Geological Survey, indicates production during the first 86 working days, viz.: Jan. 1 to April 10, 1920, aggregating 150,255,000 tons, being within 1,750,000 tons of the record of 1917, within 19,000 tons of the year 1918 and an increased production over the corresponding period of 1919 of

31,525,000 tons. About this time labor troubles seriously embarrassed the railroads between New York, Chicago, St. Louis and Kansas City, causing a sharp falling off in tonnage in the month of April. The railroads are rapidly getting back to normal.

Notwithstanding the labor troubles in April, the production in no week was less than during the corresponding week of 1919, and each week after the middle of April has shown a decided improvement over the preceding week, so that Bulletin 152, for the week ended June 5, shows a production for the year to date of 221,043,000 tons, being within 20,000,000 tons of the record of 1918; within 14,000,000 tons of the year 1917, the second largest year, and being an increase of 37,000,000 tons over the corresponding period of 1919.

The chart in Bulletin 152 shows so decided an improvement as to indicate the probability of getting up to top production in three to four weeks.

Concerning coal for export and the probable effect thereof on the domestic situation, Bulletin 151 indicates that during the first four months of 1920 there were exported through North Atlantic ports 4,551,000 tons, as against 8,291,000 tons in the corresponding period of 1919. There is nothing in these figures indicating that the export situation is adversely affecting the local markets.

Regarding bituminous tidewater shipments to New England, Bulletin 152 indicates for the first four months of 1920 3,268,000 tons, as against 2,400,000 tons during the corresponding four months of 1919, and compared with 3,859,000 tons during the corresponding period of 1918.

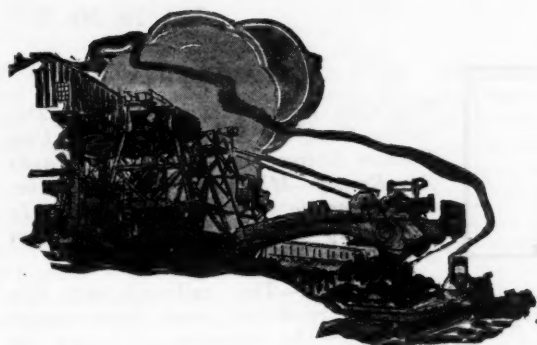
Regarding lake shipments to the Northwest, Bulletin 152 indicates that shipments from the beginning of navigation to the end of June 5, 1920, amounted to 1,992,000 tons, as against 4,967,000 tons in 1918 and 6,117,000 tons in 1919. With one-fifth of the season of navigation gone, the Lake movement is thus 2,975,000 tons behind 1918 and 4,125,000 tons behind 1919. This is the only section of the country which, from the standpoint of supply, may be said to be embarrassed at this time or facing embarrassment for the coming winter.

The several bulletins of the department indicate that in a general way the mines west of the Mississippi River are reasonably taken care of as to car supply, the only shortage of moment being reported from the State of Utah. The bulletins show as to the mines collectively that the total production is considerably in excess of last year, only 14,000,000 tons behind 1917 and 20,000,000 tons behind 1916. When consideration is given to the fact that the amount exported is 3,700,000 tons less than in 1919, it must follow that the amount available for domestic consumption is now in excess of 40,000,000 tons over the corresponding period of 1919.

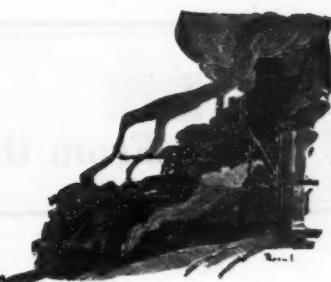
In this connection I enclose herewith copy of my letter of Feb. 6, 1918, to Dr. Garfield, then U. S. Fuel Administrator, analyzing the anthracite and bituminous coal tonnage moving into New England via the various gateways. The letter shows the source of my information.

While the bulletins of the department indicate an increase of approximately 33 per cent in the tidewater shipment of bituminous coal to New England over the first four months of 1919, they are slightly under the corresponding period of preceding years. This, however, is due to the diversion of coal from tidewater to rail routes. The information which I get from railroad men is that the quantity of coal moving via rail is in excess of previous years. We are hopeful within a few days of securing a statement of this tonnage with a view to clarifying the atmosphere as to the New England coal situation.

During the year 1918 there was an overproduction of coal, with the result that at the close of that year many industries had a stock sufficient to carry them from two to eight months. The result was that in February and March, 1919, it was almost impossible to get the industries to purchase coal. In the first five months of 1919 I believe it will be found that no industry had to close down for lack of fuel. Therefore the very substantial reduction in tonnage in the forepart of 1919 as compared with 1918 is due to the overstocking of 1918 and not due to inability of the mines to produce or the railroads to handle.



# Production and the Market



## Weekly Review

*Increased Production Noted as a Result of Order No. 7—Prices in Fairmont and Pittsburgh Resume Upward Trend—Foreign Vessels Given One-Way Bunker Requirements—Anthracite and Coke Output Improves.*

**R**ECOVERY in the rate of production in the week of June 26, with no material change anticipated in the week preceding the July 4 holiday, marked the initial effect of the Interstate Commerce Commission's order No. 7, giving preference to coal in the use of open-top cars. The commission will hold hearings this week to ascertain how order No. 7 is affecting other users of open-top cars, the particular object announced being to hear evidence on the abuse of such cars for use at the mines.

The check in rising prices in Fairmont and Pittsburgh was but temporary. As soon as coal thrown on the market by embargoes was absorbed prices recovered and are still slowly gaining. There has been some speculation as to whether turning coal away from foreign buyers would cause active bidding against New England, but no evidence of such has materialized at the present time.

Exports are virtually embargoed. Bunker coal for

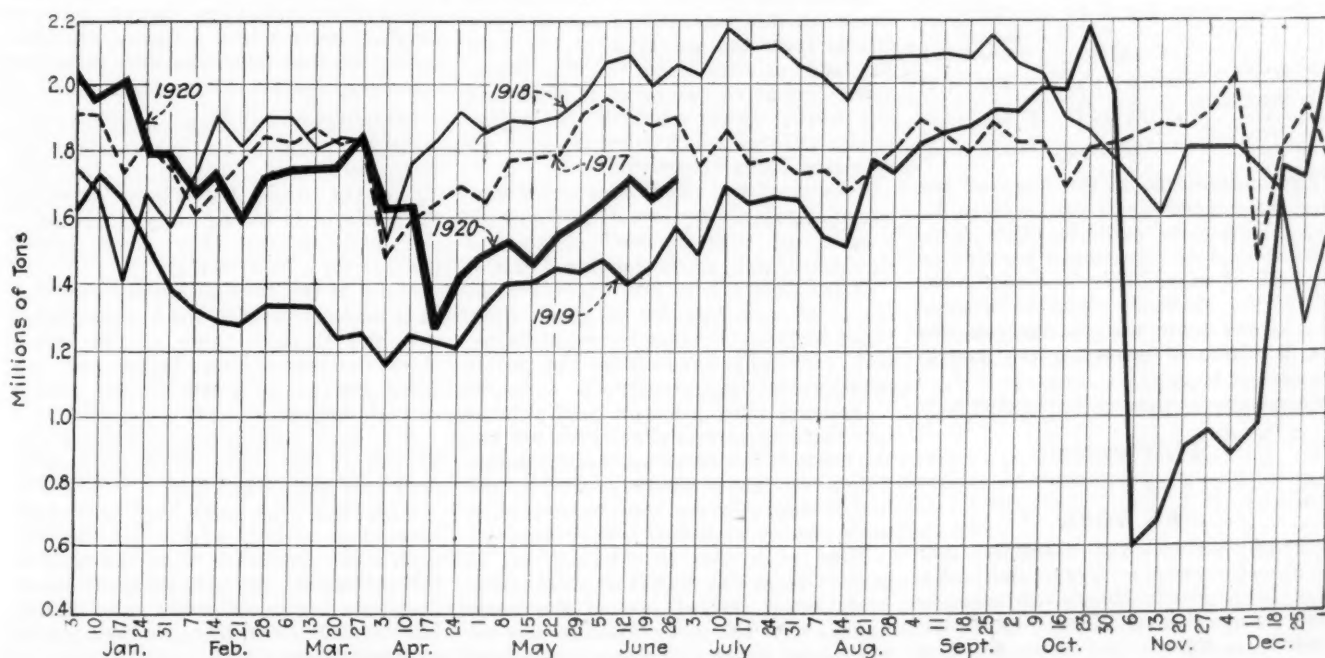
vessels under the American flag is freely permitted without restriction, but for ships under foreign flags, supplies are limited to one-way requirements. Coal is, of course, being loaded into vessels for export, but it is coal that was started from the mines prior to the effective date of order No. 6.

Anthracite production and beehive coke output were both better in the last week of June than the week previous.

The Geological Survey reports that stocks of gas coal held by 126 representative gas plants on June 1 were equivalent to three weeks and one day's average supply; for 350 central station and public utility plants stocks on June 1 were in the aggregate, if evenly divided, sufficient for three weeks and three days' supply to meet their requirements.

Industrial plants (2,486 in number), other than iron and steel, held on the same date three weeks and three days' supply.

Average Daily Production of Bituminous Coal\*



\*From weekly report of Geological Survey.

## Reports From the Market Centers

### New England

#### BOSTON

*New England Priority Fails—Market Continues Strong with Prices Higher—Rail Movement Steadily Improves—Despatch at Hampton Roads Continues Slow—Anthracite Mines Feel Diversion of Cars—Effort Is Made to Help Shipments.*

**Bituminous**—The service order that was secured in behalf of needs in this territory has proved unavailing. There is nothing left for the New England Fuel Administrator to do but to rail against the shippers, including a large number who are regularly shipping coal to this market on their obligations but not at fabulous prices. As it stands, a careful reading of Order No. 6, in the first place would have saved much trouble and annoyance.

Movement continues to show steady improvement, and the flow of empties from the New England roads increases week by week. The number of coal cars in New England has been greatly reduced in the past two months.

As a rule steamer and barge despatch at the Virginia terminals continues slow. A large number of bottoms reported for export coal are also waiting, although gradually turns are reached in line with the permits issued. In order to clear ships, some fancy prices have been paid at Hampton Roads. It is rumored that \$17.50 was paid for one lot.

Current quotations on bituminous at wholesale range about as follows:

|                                      | Clearfields      | Cambrias and Somersets |
|--------------------------------------|------------------|------------------------|
| F.o.b. mines, net tons.....          | \$10.25@ \$11.50 | \$10.75@ \$11.75       |
| F.o.b. Philadelphia, gross tons..... | 13.25@ 14.75     | 13.85@ 15.10           |
| F.o.b. New York, gross tons.....     | 13.75@ 15.10     | 14.25@ 15.35           |

**Anthracite**—Due to the hue and cry over bituminous there are said to be many anthracite collieries that have been obliged to close down because of the lack of cars. This is a costly result of the wholesale diversion of empties. Once again we are likely to see the ill effects of upsetting the normal avenues of supply.

### Tidewater

#### NEW YORK

*Demand Strong but Receipts Are Light—Consumers Urge Deliveries, with Local Yards Empty—Bituminous Movement Is Slow Except to Public Utilities—Effects of New England Priority Orders Are Not Apparent.*

**Anthracite**—There has been no not-

iceable increase in the receipts here. Due to the "outlaw" strike Port Reading was under embargo for several days and deliveries from the other lower ports were considerably delayed because of labor conditions. Embargoes were also in force on the New England roads.

Demand is growing. Consumers who placed their orders early in the season and have not yet received their winter supply of fuel are now urging deliveries. Many of the local yards are empty of the domestic sizes.

Prices for the domestic sizes were advanced 10c. per ton on July 1. Individual product is bringing from 75c. to \$1 more than the company schedule. Upstate and New Jersey inland dealers are faring better than those here.

There is a good demand for the steam coals with prices for the independent product about as follows: Buckwheat, \$5 to \$5.75; rice, \$3.75 to \$4 and barley, \$3 to \$3.75. Current quotations for company coals, per gross tons, at the mine at f.o.b., New York Tidewater, at the power ports, are as follows:

|                | Mine          | Tidewater     |
|----------------|---------------|---------------|
| Broken.....    | \$7.40—\$7.60 | \$9.25—\$9.45 |
| Egg.....       | 7.40—7.55     | 9.25—9.40     |
| Stove.....     | 7.65—7.90     | 9.50—9.75     |
| Chestnut.....  | 7.70—7.90     | 9.55—9.75     |
| Pea.....       | 5.95—6.35     | 7.70—8.10     |
| Buckwheat..... | 4.00—4.10     | 5.75—5.85     |
| Rice.....      | 3.00—3.50     | 4.75—5.25     |
| Barley.....    | 2.25—2.50     | 4.00—4.25     |
| Boiler.....    | 2.50          | 4.25          |

Quotations for the domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates.

**Bituminous**—Up to the early part of the week this market had not felt any effects from the operation of the New England priority order of the Interstate Commerce Commission. Coal was not moving easier unless it was to the public utilities which were reported as receiving larger tonnages.

Several of the piers were under embargo at various times during the week because of the "outlaw" strike and the lack of help at the loading docks.

If the order restricting exports is allowed to continue for a short time, much lower prices are expected to result, especially as soon as the public utilities have large reserves.

Contract coals move in good volume but there is some difficulty in getting the boats towed from the loading docks. There are many loaded boats in the harbor and shippers say the demand is not as heavy as it was a week ago.

Mine quotations on Pool 10 and 11 ranged from \$11 to \$11.50, with other pools being quoted around the same figures. At the piers, Pool 18 was being quoted by some shippers at around \$17 and loaded boats ranging from \$17 to \$18.50, according to the quality.

### PHILADELPHIA

*The City Is Embargoed Against Domestic Coal, but Schuylkill Valley Can Receive Shipments—Most Local Yards Are Empty—Mines Price Increases 10c. on Domestic Sizes—Bituminous Is Extremely Short—Prices Are from \$10 to \$15.*

**Anthracite**—The railroads at this time are reporting some improvement in the freight situation, although the entire city is still embargoed against receiving shipments of domestic coal. The strike has made a complete tie-up of the anthracite coal trade in this territory.

There has been much idle time in the anthracite region this past week, and the loss of tonnage will have a serious effect on the output for the year. The local retailers have received practically no coal for almost two weeks. Most yards are now entirely empty, with the exception of small tonnages of pea.

Some of the larger companies added 10c. a ton to the family sizes for July. The July prices per gross ton at mines for line delivery and f.o.b. Port Richmond for tide are as follows:

|                | Line   | Tide   |
|----------------|--------|--------|
| Broken.....    | \$7.35 | \$9.20 |
| Egg.....       | 7.45   | 9.30   |
| Stove.....     | 7.80   | 9.65   |
| Nut.....       | 7.80   | 9.65   |
| Pea.....       | 6.10   | 7.70   |
| Buckwheat..... | 4.10   | 5.15   |
| Rice.....      | 3.00   | 3.90   |
| Boiler.....    | 2.50   | 3.50   |
| Barley.....    | 2.25   | 3.15   |

The independent prices continue to vary, but the average for July is about as follows per gross ton at mines: Egg, \$8.30; stove, \$8.65; chestnut, \$8.65 and pea \$6.70.

As yet no change has been announced by the larger companies on the steam sizes, although it is expected that buckwheat will soon move upward—possibly as much as 25 cents.

All quotations for spot delivery are made with the understanding that prices are subject to change without notice. Independent shippers are disposing of their buckwheat to their old customers from \$4.25 to \$4.50.

**Bituminous**—All local industries are seriously crippled by the shortage of bituminous coal. Owing to the rail strike the roads have been devoting their efforts to taking care of the utilities and so far they have gotten through on a close margin.

Many of the more essential industries have made appeals to the State authorities and through them to the Interstate Commerce Commission and are being assisted to a considerable extent in that manner.

It is quite difficult to quote any prices on fuel at this time. Some quite ordinary coal has sold at \$10.

From this price sales have been made upward to as high as \$15 for the best coal, much depending upon the need of the consumer. Some quite good steam coals are being sold at \$12 and \$13, and blacksmithing coal has also been moved at these prices.

With embargoes against the principal tidewater piers, the yards at those

points are beginning to clear up, as no coal is being received and a fair volume is being loaded from the coal on hand before the strike.

### BALTIMORE

*Railroad Distribution Body Is Expected to Improve Coal Movement—Movement Now Is at Low Ebb—Export Trade Is Embargoed—Hard-Coal Dealers Raise Prices Here.*

**Bituminous**—The bituminous trade here is expecting better conditions shortly, and looking forward to the end of priority coal movement in any particular direction and to a start on export shipments. The failure of the out-law railroad strike and the formation by 75 railroads of a committee of nine, headed by President Daniel Willard of the Baltimore & Ohio, to have charge of car distribution and general transportation conditions, under the Interstate Commerce Commission's general direction, gives faith in a better future.

Meanwhile shipment on permit has so restricted trading that there is no real price market. Some coal is sold still at the highest of recent figures, while in other cases sales of as good coal are made far below those figures, when quick outlet to some priority or preferential consumer is found.

At tide the reserve has been cut to a few hundred cars, from which some 2,000 a day are being dumped at all the piers on the coastwise priority business. More than forty ships to take on a total of close to 250,000 tons of export coal are now anchored in mid-stream here waiting a lifting of the export embargo.

This port made an export record in June, when around 615,000 tons of coal, of which about 530,000 was cargo fuel, was loaded here on foreign bound coal carriers.

**Anthracite**—Hard-coal dealers here, faced by mounting overhead costs and higher basic mine rates, have advanced retail prices again. The trade increased prices one dollar a ton last April and the dealers here have added another 25c. a ton to white-ash coals of all sizes except pea and buckwheat. Because of independent price increases they have added 50c. a ton to the cost of Lykens Valley coal. Coal has been coming in a little better.

### Lake

#### BUFFALO

*Bituminous Situation Improves Slightly—Price Varies Considerably—Consumers Bid Against Each Other, with Supply Small—Anthracite Is in Demand, but the Lakes Get Most of It—Coke Movement Is Light.*

**Bituminous**—The situation in general is somewhat better, but it is of course all dependent on the car supply. If that could be increased materially most of the difficulties would disappear from the trade. Prices would drop to a rational figure and relief would be

general. If the existing efficiency of coal cars could be increased relief would be obtained, but not much progress has as yet been made in that direction.

Some shippers, with favorable mine connections, are able to sell soft coal at \$5 at the mine. Quite a good many, operators as well as jobbers, are trying to get \$10, even up to \$12 or so, but the amount at these prices is small. One Lake coal shipping company still sells steamboat fuel at \$6.50 delivered, but the price is generally several dollars more.

**Anthracite**—The city consumers want more coal, but that will be true until all are supplied for winter. A leading distributor says that there is more coal delivered in the city now than ever before at this time of the year, unless it might be last season.

The shippers are crowding coal forward to the Lake trade as fast as possible. Points in the Buffalo territory can be supplied in winter, but coal must reach the upper lakes before winter sets in.

The amount of coal loaded in the Lake trade for the week was 135,300 net tons, of which 76,800 tons cleared for Duluth-Superior, 32,800 tons for Milwaukee, 25,800 tons for Chicago, 13,500 tons for Fort William, 10,000 tons for Sheboygan, 3,400 tons for Manitowoc and 3,000 tons for Houghton.

**Coke**—Jobbers report a small movement of high grade coke to the furnaces on the basis of \$17 at the ovens for 72-hr. Connellsville foundry and \$16 for 48-hr. furnace. The nearest approach to low grade is breeze, but there is no regular market for it. One shipper reports offers for breeze in a single day ranging from \$1.50 to \$8.

### Inland West

#### INDIANAPOLIS

*Coal and Coke Prices Increase 75c. and \$1, Respectively—Industries Bid for Fuel and Raise Prices.*

Increases of 75c. a ton on four grades of retail coal and \$1 a ton on coke were announced last week. West Virginia splint is now selling for \$11; Eastern Kentucky lump, \$11; anthracite, egg, stove and grate, \$14.75; anthracite, nut, \$15.25 and coke, \$14.

Retailers say they are unable to get satisfactory prices on coal from the operators. They say that industries who have to have coal are bidding the price so high that the retailers are compelled to pay correspondingly high prices and the ultimate consumer must stand the raise.

Five increases in the price of coal have been made in the last three months. Before March 30, West Virginia splint and Eastern Kentucky lump were selling for \$8.50 a ton. The first increase came the day following, the second on May 11 and another May 18. The next came on June 2.

### ST. LOUIS

*Local Situation Is Fairly Good, but Country West of the River Is Seriously Lacking in Coal—Car Supply Shows Little Improvement—Steam Coal Is in Great Demand.*

The local situation is fairly good; the supply of steam coal is about equal to the demand. Outside, however, there is insufficient steam tonnage to take care of actual requirements.

Chicago and points in Michigan and the north are draining heavily on the local market at prices ranging from \$5 @ \$5.50 for lump, egg, nut, screenings and mine-run from the Standard field. This has forced local prices up.

A few operators in this field (principally the large shippers) still continue to sell coal at about \$3.50 @ \$4, the bulk of which tonnage is sold to railroads and on contracts. The mines in the Standard field average from 1½ to two days a week on commercial coal and about four days a week where railroad coal is loaded. The railroad tonnage continues heavy.

In the Mt. Olive field a little better working time on commercial coal prevails. Railroad tonnage is also heavy. The prices in this field average around \$3 @ \$3.50 to the regular trade.

In the Cartersville field the circular of about \$3.80 is pretty well maintained among big shippers, but here and there prices as high as \$5 and \$5.50 are asked on all sizes.

In the Duquoin field 2½ days a week average on commercial coal. Contracts and old orders are side-tracked for the prevailing prices of \$4.50 @ \$5.50 on all sizes.

The country west of the Mississippi River is pretty well stripped of coal. The wheat crop will be delayed in harvesting on account of the scarcity of coal for threshing. Public utility plants are running on three or four days supply ahead throughout Missouri and Arkansas.

In St. Louis proper no anthracite has come in, no smokeless and no Arkansas, and no coke is available. There is no change in retail prices.

#### DETROIT

*Quantity and Quality of Coal Coming to Detroit Is Quite Unsatisfactory—Detroit Coal Exchange Appoints a Committee to bring About Federal Action—High Prices Are Due to Manufacturers Bidding for Coal.*

**Bituminous**—Confronting a situation which dealers fear will result in placing bituminous coal on a price level of \$20 to \$22 a ton next winter, members of the Detroit Coal Exchange are working to influence intervention by Government agencies that will bring about a freer movement of bituminous to Detroit.

Shipments now coming to the city are meager and fall far short of meeting the market's requirements, both as regards quantity and quality of stock. Among some of the members of the Coal Exchange the impression has been created that the Federal authorities are

endeavoring to meet the requirements of New England consumers by diverting to that district coal that has been coming to Detroit, and that the high-grade coal is to be replaced in the local market by shipments of western stock, which is regarded by the local trade as of low quality and undesirable for either industrial or domestic use.

The Coal Exchange has appointed a special committee to lead the movement to obtain more and better coal for Detroit consumers. The committee is to seek the co-operation of the Detroit Board of Commerce, of Detroit's mayor and common council, the governor of Michigan and the state's senators and representatives. Methods of some large industrial consumers are being criticised by local coal men as stimulating objectionable price advances. Certain industrial plants, the identity of which is not disclosed, are alleged to have sent several representatives to mining districts to bid against each other for coal with the result that prices were forced up so that the coal cannot be handled by dealers serving domestic consumers.

#### COLUMBUS

*Transportation Conditions Improve Only Slightly—Coal Associations Urge I. C. C. to Extend Open-Top Order and Time for Unloading Coal—There Is No Coal on Retail Yards and Consumers Are Uneasy About the Winter Supply.*

The coal market remains unsettled with active buyers ready to snap up all coal which can be offered for shipment. But the great barrier to any stability to the trade is the car situation. Only a little improvement in transportation conditions has resulted from the orders of the Interstate Commerce Commission.

Ohio operators continue to be pessimistic over the situation, but the railroads say they are doing the best they can under the circumstances. When the coal cars were turned over to private owners by the Railroad Administration, they were in bad shape and since that time, the railroads have had little chance of catching up.

While the roads have been making special efforts to reach a better car supply, reports from Ohio mines show that only from 40 to 50 per cent of the necessary cars have been supplied during the past week.

The Southern Ohio Coal Exchange adopted a resolution urging the Interstate Commerce Commission to extend for another 30 days, the order permitting the use of open top cars only for coal.

The Michigan-Ohio-Indiana Coal Association has sent a protest to the Interstate Commerce Commission against the enforcement of the order which cuts the free time for unloading coal from 48 to 24 hours, and which is working a great hardship upon the small dealers.

Public utilities are having much trouble in getting enough coal of the right grade to keep their plants run-

ning and they fear they are facing a most serious condition.

With practically no coal on the retail yards of Columbus, the people are getting somewhat uneasy regarding the coal supply for next winter. This feeling is intensified by the natural gas companies serving Columbus announcing that a shortage of gas was certain the coming winter.

Practically no free coal is to be found anywhere, and in many instances larger industries are paying a bonus of as high as \$1 a ton for spot coal. The approximate prices at the mines, with here and there a wildcat market, are:

|  |                  |
|--|------------------|
| Hocking lump.....                      | \$4.50 to \$6.75 |
| Hocking mine-run.....                  | 4.50 to 6.50     |
| Hocking screenings.....                | 4.50 to 6.50     |
| West Virginia splints, lump.....       | 5.75 to 8.25     |
| West Virginia splints, mine-run.....   | 5.50 to 8.00     |
| West Virginia splints, screenings..... | 5.50 to 8.00     |
| Pocahontas lump.....                   | 7.00 to 8.25     |
| Pocahontas mine-run.....               | 7.00 to 8.25     |
| Pocahontas screenings.....             | 6.75 to 8.00     |
| Pomeroy lump.....                      | 5.00 to 7.75     |
| Pomeroy mine-run.....                  | 5.00 to 7.75     |

#### CINCINNATI

*Transportation Improves Slightly—Fair Price Commission Investigates Conditions—Ohio River Could Have Been Used to Greater Advantage.*

Perhaps the only thing of note in the local field this past week has been the slight improvement in transportation, but the change has been so small as to hardly cause more than a ripple in the situation that has become alarming.

Coal men on all sides are interested in the investigation being made by the Fair Price Commission and they claim that some quite interesting facts will be brought out at these meetings. The blame for the high prices is placed by the dealers on the mine operators. The local brokers and wholesale dealers declare that they are charging no more commissions than formerly.

There appears to have been considerable negligence in using the Ohio River, the greatest natural waterway in the coal fields. There has been a fine stage all during the spring and summer and this transportation highway could have been used to greater advantage in shipping coal throughout the Ohio and Mississippi valley.

The use of this river would have greatly relieved the coal situation at points along the Ohio and its tributaries, and there is no reason why coal could not be shipped down this great waterway and then reloaded for interior points. But as it is, only a comparatively small amount of coal has passed through the Cincinnati harbor.

Southern Ohio coal men do not look for any improvement in the fuel situation for some time. There will be no relief until there is a sufficient car supply so that an amount of coal can be moved to meet the requirements of consumers.

#### MILWAUKEE

*Soft Coal Receipts Are Much Behind Record for 1919—Lakes Must Relieve Situation by Maximum Tonnage—Anthracite Prices Advance—Soft Coal Held at High Rates.*

With the month of June gone and

receipts of soft coal over a million tons behind the record of last year, the prospect of a fuel famine in this section of the country next winter looms larger with each passing day. There are five months of Lake navigation left, and unless receipts can be maintained at a maximum figure throughout that period the game will be lost. Rail conditions are deplorable and but little coal reaches the yards through that channel.

Receipts of anthracite are slightly in excess of the record of last year up to the present time, but the stock of this grade of coal is less than it was in 1919, because no anthracite was carried over from the previous season, as was the case in the spring of 1919.

Anthracite was advanced 10c per ton on July 1. No price list on soft coal has been formulated by dockmen, but the following figures rule, seemingly by common consent. An extra charge of \$1 per ton is added to all coal carried into bins:

|                                    |         |
|------------------------------------|---------|
| Anthracite:                        |         |
| Stove and nut.....                 | \$14.85 |
| Egg.....                           | 14.70   |
| Pea.....                           | 13.20   |
| Buckwheat.....                     | 11.60   |
| Illinois and Indiana coal:         |         |
| Steam, screened.....               | 9.00    |
| Steam, screened, retail price..... | 10.00   |
| Mine-run.....                      | 8.50    |
| Mine-run, retail price.....        | 9.50    |
| Youghiogheny:                      |         |
| Screened.....                      | 10.50   |
| Mine-run.....                      | 10.00   |
| Screenings.....                    | 9.25    |
| Smithing.....                      | 12.75   |
| Cannel.....                        | 16.00   |
| Pocahontas:                        |         |
| Lump, egg and nut.....             | 13.75   |
| Mine-run, steam.....               | 10.50   |
| Mine-run, retail.....              | 11.25   |

Receipts of coal by Lake for the first six months of 1920 aggregate 265,671 tons of anthracite and 244,635 tons of soft coal, against 263,572 tons of the former and 1,269,992 tons of the latter in 1919, a gain of 2,099 tons of anthracite and a loss of 1,025,257 tons of soft coal in comparison with the receipts up to the present time last year.

#### MID-WEST REVIEW

*Embargoes on Michigan and Eastern Points, Send Local Coals to National Territories—Retail Dealers Crowd the Market and Coal Is Getting Scarcer—Situation Is and Will Be Critical for Some Time.*

Coal is moving a little more freely to points in Illinois, Iowa, Minnesota and Wisconsin, because operators who have been tempted by high prices to ship coal into Michigan have been forced to discontinue this, as Michigan and Eastern points have been embargoed so far as Illinois and Indiana coals are concerned.

As a result, our local coals are going back for the time being into their natural territories, and the retailers and manufacturers of Iowa, Minnesota, etc., are being given an opportunity to accumulate a little coal. The fact that Chicago for the time being is partly embargoed goes still further to relieve the acute situation as now prevails in the Northwest.

A noticeable feature of the trade is the fact that retail dealers are now beginning to come into the market in

large numbers. Up until quite recently the manufacturers were the people buying the coal, but now the retailers are as numerous in our coal markets as the manufacturing or steam coal buying element.

One reason for the influx of retail dealers is that the farmers are now ready to purchase coal for threshing purposes, consequently the retailers are trying to cover, and with but medium success, as all grades of coal are harder to obtain as the season advances.

The coal shortage has now reached the point where some industries have been forced to curtail production or close down altogether, and it is freely predicted that within a short time the "non-essentials" will not be allowed to receive coal.

Of course the car situation will doubtless improve to some extent, owing to the efforts of the railroads and the Interstate Commerce Commission, but it will be considered somewhat in the light of a miracle, if the mines will produce enough coal between now and the fall, to keep our industries running and our people supplied with an adequate amount of coal for the early winter months.

## CHICAGO

*Demand Increases with Supply Stationary—Mine-Run Sells at Same Price as Prepared Sizes—Little Free Coal Is Obtainable from Southern Illinois—Railroads Culminating in Chicago Are Embargoed.*

The Chicago coal market continues quite favorable for the producers as the demand exceeds the supply, and the demand is growing in volume every day while the supply is remaining practically stationary.

The car supply in some districts has improved slightly but not enough to influence the market in the slightest degree. It is thought, however, that within the immediate future more cars will be available at the mines as the measures taken by the Interstate Commerce Commission ought to bring about some improvement soon.

Prices on current sales appear to be between \$5 and \$6 f.o.b. mines on central and northern Illinois coals. Screenings and mine-run are selling at the same prices as lump or other domestic prepared coal.

Current sales on the higher-grade fuels from Williamson, Franklin and Saline counties are from \$5.25 to \$7 f.o.b. mines, according to grade and quality. It must be remembered, however, that the great bulk of southern Illinois is moving at prices ranging from \$3.55 to \$4 mines, on old orders, and that consequently there is little free coal obtainable from southern Illinois.

Prices on Indiana coals for current shipment are from \$4.75 to \$7 according to grade. Indiana Third Vein coals are selling on the market at from \$4.75 to \$5.25 mines for screenings or mine-run, while some Fourth Vein coals from either the Linton or Clinton districts are bringing as high as \$7 mines for

14-in. lump. No great changes are expected in the market for the next week or two.

## South

### BIRMINGHAM

*Production Improves with Greater Car Supplies on Southern Ry.—Strikes and Irregular Working Keep Down Output—Steam and Domestic Coal Are Quite Short—Demand Is Strong.*

A more equitable and liberal distribution of coal-loading equipment has been made to mines on the lines of the Southern Ry. this week, this line being enjoined from alleged preferential assignment of cars to fuel-contract mines, and the number of cars available being increased to some extent by the effectiveness of the Interstate Commerce Commission order. A like improvement is expected on the Louisville & Nashville and Frisco lines.

These helpful factors are bringing about a better production, but labor disturbances, where local strikes are being maintained for union recognition and where mine workers report for duty irregularly, are seriously crippling the supply of coal, which is so badly needed from the merchant and domestic mines of the district.

Industries of every character, both utilities and bunkering interests, are suffering as a result of the irregular and insufficient deliveries they are receiving, and sales agents and brokers are besieged by wire, letter and personal visits of fuel-users from every section of Southern territory.

There is very little spot coal of the better grades to be had above contract requirements, and the situation is little better as respects the medium and lower qualities. Quotations, which remain comparatively steady, are as follows per net ton mines:

|                                   |             |
|-----------------------------------|-------------|
| Carbon Hill mine-run.....         | \$4.25@5.00 |
| Black Creek and Cahaba mine-run.. | 4.00@6.00   |
| Nickel-plate mine-run.....        | 3.50@5.00   |
| Big Seam mine-run.....            | 2.90@5.00   |

The receipts of domestic coal are quite unsatisfactory, as a number of mines producing this grade of coal in Walker, Bibb and Tuscaloosa counties are entirely or partially closed by several weeks. Contracts for monthly quotas past due, which could not be shipped on account of labor difficulties and car shortage, have been cancelled in most cases, as there is no possible chance for the mines to catch up with those deliveries later.

There is only approximately 14,000 tons of domestic coal in the yards of Greater Birmingham at this time, and retailers have been endeavoring to stock up since April 1. Consumers are showing little disposition to lay in winter coal, and the accumulation of reserves. Domestic quotations are as follows per net ton mines on lump and nut sizes:

|                             |             |
|-----------------------------|-------------|
| Black Creek and Cahaba..... | \$4.80@6.50 |
| Carbon Hill.....            | 3.80@4.75   |
| Corona.....                 | 5.70        |
| Montevallo.....             | 7.45        |
| Big Seam.....               | 3.75@4.00   |

## LOUISVILLE

*High Prices Check Bidding of Industrial Buyers—Retailers and Domestic Consumers Are Not Stocking Coal—Demand Is Strong for Immediate Use—Suits Are Filed Against Contract Violators.*

It is claimed by some coal men that the markets are now so high that consumers have stopped the practice of bidding up the markets. At any rate advances have about ceased, and the markets appear firm. Eastern Kentucky prices have not advanced materially for the past two weeks, although there have been some slight gains in Western Kentucky prices.

Strikes in some sections of Eastern Kentucky and West Virginia at the present time may give individual mine owners trouble, but it will not affect production, as there is such a car shortage that half of the mines could be shut down, and the balance would not secure a full supply even then.

Retailers are stocking practically no coal, and the same is true of domestic consumers. High-priced coal is selling for immediate consumption. It is believed that industrial demand is for immediate use only, and that stocks are not accumulating.

The industrials and the utility companies continue to be the big buyers, with some little demand coming from railroads.

Much complaint is being heard from jobbers, consumers and even retailers concerning failure of some mining companies to fill contracts, after the market went up. Several suits are pending, and a number of others are to be filed.

Quotations show Eastern Kentucky gas coal at \$8.75@9.50 for mine-run; non-gas or steam, \$8.25@8.75; Western Kentucky, \$5.25@5.50. Some Western Kentucky block is reported to be selling at \$5.75@6 a ton, with some small lots of screenings at \$5@5.25. All these prices are at the mine.

## West

### SAN FRANCISCO

*Conditions Remain Stable—Coal Comes from Utah and Wyoming Mines, with Small Amount from New Mexico.*

Conditions continue stable here. The bulk of the coal is shipped to San Francisco from the Utah and Wyoming mines, at the same price as last quoted. The shipments from New Mexico are comparatively small, with the price steadily rising, according to announcement. The present figure of \$5.25, will go up at the rate of 25c. a month for the next three or four months. A large quantity of Utah coal is used each month by the King Coal Co. in bunkering steamships.

The bituminous prices, f.o.b. mines, wholesale, Utah and Wyoming, per net ton, are as follows:

Stove and lump, \$4.50.

The bunker price is \$13.55.

## News From the Coal Fields

### Northern Appalachian

#### PITTSBURGH

*Divergence of Views on Car Supplies—Spot Market Recovers Most of Its Decline—Some Operators Take Care of Regular Customers.*

The curious situation is presented of the coal interests complaining that the 100 per cent car-supply order, issued by the Interstate Commerce Commission in favor of the coal mines, has produced but little increase in their car supplies; and of the iron and steel interests complaining that the operation of the order has greatly reduced their car supplies, through cars being taken out of the one service and being put in the other.

The declining tendency in the spot coal market reported a week ago was short lived, as prices have since been advancing and are now nearly as high as at any time. The evidence is that the decline was due to embargoes on shipments east for export, rather than to there being larger supplies for consumption at home in proportion to market demand.

Attention is called to the fact that some operators are selling coal to more or less regular customers at prices ranging generally from \$6 to \$8 a ton, instead of exacting all that the market might pay if the coal were simply sold to the highest bidder. The ordinary open market for spot shipment is quotable at about \$9 to \$10, per net ton at mine, Pittsburgh district, for steam, gas and byproduct coal; an advance of fully a dollar a ton from the reduced level reported a week ago.

#### CONNELLVILLE

*Rate of Production Is Practically Unchanged—More Coal Is Moving to Byproduct Ovens—Spot Prices Are Higher—Contracting Is Slow.*

Connellsville coke operators continue to complain of their car supplies, which in most quarters are represented as having decreased since the Interstate Commerce Commission's order, as to coal-mine preference, went into operation; but there is no evidence that there has really been any change of consequence. Shipments are still quite unsatisfactory, of course, being at only about 70 per cent of the rate in March.

Coal operators do not admit that there has been much improvement in their car supplies, but there is no doubt that considerably more coal is moving, and supplies to byproduct ovens have accordingly increased; more byproduct coke is being made, easily more than sufficient to offset the largest decrease that can have occurred in the output of coke by the Connellsville region.

The market for Connellsville coke for spot shipment has advanced \$1 to \$2 a ton in the week. Sales of both furnace and foundry coke have been made at \$18, though some coke has gone at slightly less.

The advance hardly reflects increased demand or decreased offerings, but rather a tendency for some consumers to become more accustomed to high prices, and nearly all producers becoming accustomed to asking high prices.

The contract furnace-coke market is not moving very well, prices asked failing to attract consumers not yet covered, but the bulk of the second-half contracting has been done. The market for both furnace and foundry coke is quotable at about \$17.50 to \$18 for spot and at \$12 for contract, per net ton at ovens.

The Connellsville *Courier* reports production in the Connellsville and Lower Connellsville region in the week ended June 26 at 185,610 tons, an increase of 6,880 tons.

#### FAIRMONT

*Further B. & O. Strikes Interfere with Production in Fairmont Region—Railroads Are Congested from Mines to Tide—Coal Moving East Is for Railroad Consumption.*

When the strike of switchmen and yardmen on the Baltimore & Ohio extended to Fairmont on Saturday, June

26 it brought coal production and coal movement in the Fairmont region almost to a complete standstill, while in other northern West Virginia fields, production was almost as seriously affected. On the Western Maryland the coal freight movement was also practically at a standstill. The Fairmont strike was short-lived, the men voting Sunday night to return to work.

The delay of the Railroad Labor Board in reaching a decision on the demand for an increase in wages, was the reason given by the strikers for their going out. While some coal was produced and moved in the Fairmont region during the five days preceding Saturday, both the mines and the various railroads were greatly handicapped, the car supply being seriously curtailed, owing to the fact that the Baltimore & Ohio railroad was unable to move any coal to speak of east of Grafton. For the same reason it was impossible to bring in empties from the East.

However, there were more cars available for the mines than producers had any reason to expect, in view of the fact that there was a serious congestion of freight all the way from Fairmont to New York and other points, with yards in the Fairmont region also clogged with cars because of the inability of the railroad to move loads except to quite a limited extent.

While there was a fairly adequate run of empties on the Monongahela R. R. in West Virginia for the first few days of the week, nearly all the supply during the latter part of the week was assigned for railroad fuel. That was true also as to mines on other railroads, nearly all the 300 cars furnished Monongah division mines of the B. & O. being assigned for railroad-fuel loading.

### Estimates of Production

FROM THE WEEKLY REPORT OF THE GEOLOGICAL SURVEY

#### BITUMINOUS COAL.

| 1920               |            |                       | 1919 (a) |           |                       |
|--------------------|------------|-----------------------|----------|-----------|-----------------------|
|                    | Week       | Calendar Year to Date |          | Week      | Calendar Year to Date |
| June 12b.....      | 10,355,000 | 231,421,000           |          | 8,485,000 | 192,489,000           |
| Daily average..... | 1,726,000  | 1,658,000             |          | 1,414,000 | 1,379,000             |
| June 19b.....      | 10,077,000 | 241,499,000           |          | 8,681,000 | 201,170,000           |
| Daily average..... | 1,680,000  | 1,659,000             |          | 1,447,000 | 1,382,000             |
| June 26c.....      | 10,454,000 | 251,953,000           |          | 9,470,000 | 210,640,000           |
| Daily average..... | 1,742,000  | 1,662,000             |          | 1,578,000 | 1,389,000             |

#### ANTHRACITE

| 1920          |           |                       | 1919 (a) |           |                       |
|---------------|-----------|-----------------------|----------|-----------|-----------------------|
|               | Week      | Calendar Year to Date |          | Week      | Calendar Year to Date |
| June 12.....  | 1,907,000 | 38,289,000            |          | 1,695,000 | 35,047,000            |
| June 19b..... | 1,803,000 | 40,092,000            |          | 1,753,000 | 36,800,000            |
| June 26c..... | 1,820,000 | 41,912,000            |          | 1,855,000 | 38,655,000            |

#### BEEHIVE COKE

| United States Total |          |         |            |           |
|---------------------|----------|---------|------------|-----------|
| June 26             | June 19b | June 28 | 1920       | 1919      |
| 1920                | 1920     | 1919    | to Date    | to Date a |
| 406,000             | 372,000  | 284,000 | 10,532,000 | 9,508,000 |

(a) Less one day's production during New Year's week to equalize number of days covered for the two years. (b) Revised from last report. (c) Subject to revision. All figures in net tons.

**NORTHERN PAN HANDLE**

*Railroads Improve Service, but Only 40 Per Cent Commercial Coal Is Mined—Eastern Ohio Also Speeds Up Production.*

There was some improvement reported in railroad service at mines loading commercial coal in the Northern Pan Handle district and carriers appeared to be making an earnest effort to comply with the 50 per cent supply order, though during the week the tonnage of commercial fuel mined and loaded equalled only about 40 per cent of potential capacity.

Mining conditions in general were pronounced as satisfactory except for the shortage of labor, due solely to broken time in the operation of mines following in the wake of an insufficient car supply.

Just as there was a slight improvement in the course of the week in the Northern Pan Handle region so also were Eastern Ohio mines able to speed up production to a limited extent, although still seriously handicapped by inability to secure a sufficient supply of cars.

**Middle Appalachian****VIRGINIA**

*Production in Virginia Decreases—Permits for Export Are Cancelled—Commercial Buyers Absorb Spot Coal.*

Production in Virginia during the week ended June 26 was 136,261 tons, as against 143,000 tons the previous week, losses in production from all sources amounting to 53,845 tons, the mines operating to 66 per cent of capacity.

Under service order No. 6 and No. 7 of the Interstate Commerce Commission permits for export via Charleston, were cancelled and no new authority to move coal was issued. In that way export shipments were largely cut off, although, as reported last week, it had not been generally anticipated that exports from the Virginia fields would be cut off because of the fact that Charleston, S. C., is too far south to make any difference as to New England shipments.

Commercial buyers, it was stated at the end of the week, were absorbing all spot coal which was limited in volume, at a price ranging around \$9.

**KANAWHA**

*Embargoes Cut Off Exports and Send High-Volatile West—Car Supply Is Erratic but Production Increases.*

Even before the New England order became effective Kanawha splint could not be shipped to tidewater because of a congestion there. The feeling existed among shippers that embargoes by the railroad were only a round-about way of cutting off Kanawha exports. Shipments to Inland Eastern markets were relatively small as compared with previous weeks.

With high-volatile coal cut off altogether from the piers it was felt that such congestion as had existed there should be speedily cleaned up. With a barrier existing against seaboard consignments there was a rather marked increase in the Western movement of Kanawha coal, even the Lakes deriving some benefit.

Production in the week of June 26 was 105,000 tons as against 98,000 tons for the previous week. It is believed that car supply was not above forty-one per cent. Traffic on Coal River was interrupted for a time about the middle of the week by a derailment which served to shut off empties and car supply on the Kanawha & Michigan was low during the week.

Monday, June 28, however, saw the largest car supply in recent months, the mines on the Chesapeake & Ohio system as a whole having an 88 per cent supply while in the Kanawha region mines had 104 per cent. Coal River mines on the same day received a supply equal to 88 per cent of requirements.

**NEW RIVER AND WINDING GULF**

*Priority Orders Make It Almost Impossible to Send Coal East, Even for New England Use—Considerable Smokeless Goes West—Production Slumps on the Gulf and in New River Field.*

While the priority order of the Interstate Commerce Commission may be giving relief to New England, it has resulted in such a snarl at tidewater terminals that by Monday, June 28, it was impossible to ship either high or low-volatile coal to Atlantic piers. The priority order, combined with orders forbidding export (thinly disguised as embargoes), put an end almost entirely to the exporting of smokeless coal, and by the end of the month made it almost impossible even to send coal eastward for New England use.

It was impossible to handle all the coal at tidewater held for New England transshipment, yet neither the Interstate Commerce Commission nor the railroads would permit any of the surplus coal to be exported. Only coal to Pool 1 and that for the Navy was permitted to be forwarded to tidewater after Monday, June 28.

The tidewater embargoes forced a larger volume of smokeless coal west through Russell, Ky., and through other terminals than at any time during the present year.

Production fell off in the week of June 26 owing to a slump in the car supply. The congestion at tidewater is expected to contribute further to the car shortage, although on June 28 cars were more plentiful on the Chesapeake & Ohio than they had been at any time during the year.

Production in the Winding Gulf field on the Virginian Ry. slumped in the week of June 26. Operation was limited to about half a week compared with about four days during the previous week. On the Chesapeake & Ohio

car supply was still hovering around 40 per cent. The orders of the Interstate Commerce Commission have resulted in such a congestion at Newport News that the C. & O. has embargoed all tide shipments except Pool 1 for Navy use.

Hope for a better car supply in the week of June 26 in the New River field, as promised by the C. & O., was dissipated early in the week. Three full working days had been promised but the car supply was under that of the previous week. Production in the week of June 19 was 114,000 tons, but decreased in the week of the twenty-sixth to less than 100,000.

Many New River producers began shipping their coal west anticipating the congestion at tidewater. After Monday, June 28, tidewater shipments of smokeless coal over the C. & O. ceased to a great extent with a corresponding increase in Inland West and Lake shipments.

**POCAHONTAS AND TUG RIVER**

*Car Supply Is Equalized in N. & W. Fields—Priority Orders Cut Off Exports and Create Confusion—Western Coal Fields of U. & W. May Receive More Empties.*

Although production in the Norfolk & Western fields, during a part of the week ended June 26, appeared to be on a larger scale than during the previous week, not all the regions supplied by the N. & W. enjoyed the benefit of the increased car supply, it having been the policy of the road to equalize the supply available in the different fields from week to week, as a result of which some of the districts suffered.

While the flow of empties from the West was somewhat in excess of that witnessed earlier in the month, it was not what had been anticipated. The general confusion created by the New England priority order, virtually cutting off exports, tended to materially affect the supply of empties.

While sufficient time had hardly elapsed to observe the effect of the priority order, it was the judgment of some operators that such an order would prove a boon to shippers in the western fields of the Norfolk & Western although more difficulty would be experienced in getting cars back.

Production as a whole in the Pocahontas region is now slightly over 50 per cent of potential capacity but whether it will be possible to maintain production at that figure will depend to a large extent upon how empty cars move in from the West.

While rather deploring the priority order which served to shut off export shipment, yet some of the Tug River operators were rather of the opinion that the decreased eastern movement, which would inevitably result from the priority order, would tend to help matters insofar as the western coal fields of the Norfolk & Western were concerned, by increasing the supply of empty cars available for this field.

### NORTHEAST KENTUCKY

*Production Here Is 41 Per Cent of Capacity — New England Priority Order Has Little Effect in Kentucky.*

Production in the Northeast Kentucky field during the week ended June 26 was 122,535 tons, or 41 per cent of capacity. The loss of 59 per cent of capacity was almost wholly due to lack of cars.

The New England priority order had little effect in Kentucky coal fields. Markets in northern Ohio, Illinois and Indiana are receiving most of the output of the eastern Kentucky mines. So far as could be learned there had been no material increase in lake shipments.

### Southern Appalachian

#### ALABAMA

*State Should Receive \$500,000 from Coal and Iron-Ore Tax, in the Fiscal Year.*

Alabama will receive a little more than \$500,000 as taxes on coal and iron during the fiscal year, which began last October, if the monthly payments continue to make the average they have made during the first seven months.

Figures compiled by the State Auditor's Department show that the total amount paid in to the treasury during the seven months was \$294,263.58, an average of \$42,037.65, or a total of \$504,451.60 for the 12 months.

The tax of 2c. a ton on coal has exceeded the total from the tax of 3c. a ton on iron by about \$100,000. The total from coal has reached \$197,111.72, while the total from iron has been \$97,151.86. During April, the last month reported to the state, the tax on coal was \$28,918.12, and the tax on iron \$14,197.11.

### Middle Western

#### INDIANA

*State First-Aid and Rescue Meet Will Be Held Next August—Prizes Aggregating \$3,000 Are Offered—Governor Goodrich Indorses Proposition for State to Purchase a Coal Mine and Coal Cars.*

Miners in the western part of Indiana are preparing for the competition in the first-aid and rescue meet at Clinton, Ind. The affair will be the largest ever held in the state and prizes of \$3,000 have been offered for the winning teams.

The Indiana Bituminous Coal Operators' Association and the United Mine Workers of America (district No. 11) will defray the expenses of one team each to the national meet at Denver, Col., during the latter part of next August.

A new feature, which will be introduced in the state meet, is the adoption of the methods of rescue and first-aid

work as recommended by the Bureau of Mines.

A coal development program will depend on whether the school land adjacent to the lands now owned by the Standard and the Rio Grande coal companies will be available.

To provide for the speedy development of the property the state land board required a minimum rental of \$5,000 the third year and of \$10,000 a year thereafter.

After many conferences, Governor James P. Goodrich, of Indiana, has indorsed a resolution adopted by the State Purchasing Committee proposing that the state purchase a coal mine and coal cars in order to insure state institutions an adequate supply of fuel. As the project will entail an expenditure of several hundred thousand dollars, it will be necessary to obtain an appropriation from the State Legislature, which shortly is expected to convene in special session.

The resolution was submitted to the Purchasing Committee by Charles A. McGonagle, superintendent of the Indiana Boys' School. Upon adoption by the committee, it was immediately presented to the Governor who officially approved it. This is the first time in the history of the coal industry in Indiana that such active steps have been taken toward the ownership by the state of a coal mine.

### Missouri Valley

#### OKLAHOMA

*Auction of Indian Coal Lands Is Held at McAlester, Okla.*

Bids of \$505,312.96 were made for coal deposits sold at the Government auction of Choctaw and Chickasaw holdings at McAlester recently. Tracts aggregating 25,288 acres were disposed of, bringing the average price to \$19.98.

This was the third and last sale under special act of Congress, and the remaining 423 tracts will continue as tribal property until another disposal law is passed.

The highest price, of \$54 an acre, was paid by the East McCurtain Coal Co., Fort Smith, Ark., for 3,443 acres near McCurtain. No bids were received above the minimum set by the government.

#### NORTH DAKOTA

*Railroads Promise Help for Lignite Mines—Conference Is Held to Discuss Plans—Spur Tracks Are Discussed.*

Recently a conference was held in the offices of the Railroad Commission at Bismarck, between railroad officials and coal operators concerning the development of the lignite industry.

The chief problem taken up was that of supplying spur tracks to coal mines and the manner of paying the cost of the installation.

The Railroad Commission probably will issue orders in the near future covering the subjects discussed. The prac-

tice of carriers, it was stated, is to install the portion of a spur track from the main line to the point of clearance of a car, and to ask the operators to install the remainder of the track and pay for the right-of-way.

It was reported that the railroads generally observed the practice of furnishing steel for the tracks and leasing them. Assurance was given by the railroad representatives that they would furnish second-hand steel whenever possible for spur tracks, but gave no assurance that new steel would be purchased for such work.

### Western

#### UTAH

*Special Pillars Should Not Be Taxed—Legislation Is Recommended—Outcome Affects Method of Mining.*

That pillars of coal left in mines for the protection of haulageways should not be classed as coal or subject to tax, is the contention of the Independent Coal & Coke Co., of Utah, before the State Board of Equalization. These pillars, it is argued, should be left so that coal seams farther back from the surface may be mined by future generations, when the coal near the outcrop has been mined out.

The board has, in the present instance, not yet rendered a decision, but it has for some time had under consideration the question of recommending legislation with regard to haulageways in Utah mines.

It is recognized that once the pillars of a mine are pulled it will no longer be possible to reach (by tunnels) the ground farther back; and the topography of the Carbon County coal fields is such that mining by means of shafts is not practicable, as in the coal-mining districts in other parts of the country.

The problem here is, therefore, an individual one.

### Alaska

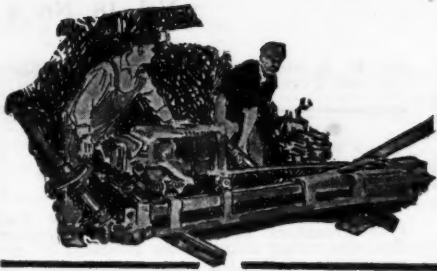
#### BERING RIVER

*Coal Lands on Government Railroad in Alaska Are Ready for Sale.*

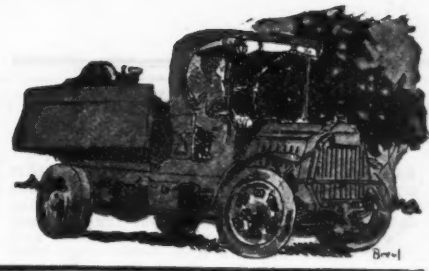
Under the coal lands leasing law enacted in Oct., 1914, coal lands in the Bering River, Cook Inlet, Matanuska and Nenana coal fields have been divided into leasing blocks or units, ready for sale. The two last named fields are tributary to the Government railroad now being constructed.

New town sites have been established upon the public lands along the line of the railroad and lots for business and residential purposes disposed of through the Land and Industrial Department of the Alaskan Engineering Commission.

As soon as arrangements are completed for traffic on the Government railroad, large numbers of settlers are expected to rush into the agricultural districts.



# Mine and Company News



## ALABAMA

**Birmingham**—The Sheffield Iron Corporation has closed a contract with the Semet-Solvay Co. whereby the Ensley plant of the latter company will be furnished with coal from the mines of the Sheffield corporation near Porter and Littleton; the coke produced is to be shipped to Sheffield and used in the furnaces of the Sheffield company.

The Semet-Solvay Co. is now coking about 1,000 tons of coal per day for the Alabama company for use in its furnaces. There are 240 byproduct ovens at the Ensley plant and the company maintains a heavy production of byproducts, for which there is a strong and steady market.

This district is experiencing the strongest demand for both furnace and foundry coke that has been in evidence before in quite a while. Both grades are quite scarce and the local consumption of furnace coke is greater than at any time in the past year; practically every furnace stack in the district, except those undergoing needed repairs, being in blast. Foundry coke is quoted from \$11 to \$12.50 per net ton ovens.

## NEW YORK

**New York**—The Crystal Coal Corporation, with offices at 47 Broadway, New York City, has been organized under the laws of Delaware. The new corporation has a capital stock of \$1,000,000 and, according to an announcement, is to engage "actively in the sale and production of anthracite and bituminous, particularly for export." It was said at the offices of the corporation that contracts for the export of coal to Italy, France and Scandinavia have been closed for more than 2,000,000 tons, for movement within the next two years.

## PENNSYLVANIA

**Lansford**—As the result of a gas explosion in the Lehigh Coal & Navigation Co.'s No. 10 mine on June 21, two men were instantly killed and two were taken to the Coaldale Hospital in a critical condition. All were miners.

Michael Dillon, of Tamaqua, and Paul Scroback, of Coaldale, were the men killed, several hours being required to reach their bodies, owing to the debris and gas. The force of the explosion was so great that dirt was blown more than 600 feet to the top of the shaft.

**Scranton**—Two miners of the Delaware Lackawanna & Western Company were caught in a cave-in in the surface seam of the National mine. One of the men was instantly killed while the other was imprisoned between two

loaded mine cars. Twenty nine hours were required before the rescue party was able to dig its way into the imprisoned miner to relieve him. The work was exceedingly dangerous as there was continual danger of further caves occurring. In order to reach the miner, it was finally necessary to drive a bore hole through a large slab of coal and then enlarge this hole to a size that would permit the miner to crawl through it. If the slab of coal had been removed the roof would have fallen and caused the death of the imprisoned man.

**Cowanshannoc**—Angelo Potegrina, aged 45, and Loret Monterelli, aged 43, were instantly killed on June 14 in a gas explosion at one of the mines of the Pittsburgh Carbon Steel Co. at Buttermilk Falls, three miles west of Kittanning. The mine was badly damaged by the force of the explosion which is thought to have been caused by the unfortunate men coming in contact with a pocket of gas as they were carrying open lights.

**Waynesburg**—Two deeds, the largest in the history of Greene County, were filed on June 14 in the office of the Recorder at this place. Both, however, are dated April 1, 1920. One deed was to the Piedmont Coal Co. by the Josiah V. Thompson coal interests, in which coal under 625 tracts of land, located in Cumberland, Dunkard, Franklin, Gilmore, Greene, Jefferson, Monongahela, Perry, Wayne and Whitley townships, and Rice's Landing and Carmichael's boroughs, amounting to thousands of acres of its unused land in Indiana County.

**Wilkes-Barre**—The Lehigh & Wilkes-Barre Coal Co. is making preparations to remove a mammoth culm bank located on the Wilkes-Barre city line near Gilligan St. The company expects that about three million tons of coal will be recovered.

Two miles of railroad track are being laid around the bank for a five cu.yd. steam shovel. The culm will be loaded into mine cars, transferred to a pocket and then loaded into gondolas. It will then be taken to the Empire Colliery washery, at Wilkes-Barre. It will require about three years to remove the bank.

## WEST VIRGINIA

**Morgantown**—What is giving an impetus to the development of the coal lands on Scotts Run and in other parts of Monongalia County at the present time, is the strong probability of an extension of the Morgantown & Wheel-

ing R.R. Of late there have been a good many new coal companies organized to operate both in Monongalia and Preston counties. While there was a steady growth in development during the war period there has been even a more rapid growth since the close of the war.

**Beckley**—The Gracum Coal Co. has purchased about 1,900 acres of coal land on Fat Creek, in Raleigh County, from the Beaver Coal Co., the consideration being, it is said, \$200,000. It is understood that the purchasing company will begin development work at an early date.

**Page**—A deal of considerable magnitude has been consummated involving a change in the ownership of the Loup Creek Colliery Co. This coal operation and all its holdings have been acquired by the Virginian Ry., the transportation company having purchased the mines for the purpose of insuring a dependable fuel supply for itself. The present capacity of the plant is about 500,000 tons a year. In view of increasing the output, some 2,000 additional acres of coal lands have been purchased.

**Charleston**—The mining and shipment of coal at the plant of the Nellis Coal Co., on Brush's Creek in the Coal River field has begun, although for the time being the company is using a temporary tippie, to be replaced later by a permanent structure. Other improvements will be made entailing an expenditure of about \$250,000. It is proposed to build more houses. The new tippie will be equipped with shaker screens, picking tables, loading bins, etc. The company has available for development about 2,000 acres of No. 2 gas coal.

Two West Virginian coal companies materially increased their capital stock during the early part of June. One was the Fairmont & Cleveland Coal Co., of Fairmont, the capital stock of that concern being increased from \$600,000 to \$1,250,000. W. E. Watson, of Fairmont, is the president of the company. The South Fork Coal Co., of Huntington, W. Va., increased its capital stock from \$500,000 to \$700,000. The president of the company is Donald Clark.

The entire holdings of the H. C. Coal & Coke Co. in Kanawha County, near Charleston, were taken over by A. S. Davis and D. E. Mitchell, of Pittsburgh, Pa. The new owners will make extensive improvements on this property and will operate it in connection with their 50,000 acres of coal lands recently acquired by them in Buchanan County, W. Va.

## Industrial News

**Chicago, Ill.**—The Krehbiel Co., of this place, announces that the Gladstone Coal Co., of Petersburg, Ind., has placed a contract with it for a new four-track wood tippie with Jacobson horizontal screens and picking tables for the new mine near that place. Also that the Key Coal Co., of Evansville, Ind., has ordered a three-track Jacobson horizontal screen and picking table of Krehbiel Co., for the mine Caledonia No. 3 near Evansville, Ind.

**New York, N. Y.**—The Chicago Pneumatic Tool Co., with offices here, announces the election of Allan E. Goodhue as vice president in charge of sales. Mr. Goodhue since May 1, 1919, has been managing director of the company's English subsidiary, The Consolidated Pneumatic Tool Co., London, England; also director of European sales for the Chicago Pneumatic Tool Co. Mr. Goodhue was for a number of years connected with the Sales Department of the Midvale Steel Co. and Midvale Steel and Ordnance Co., in Philadelphia, Chicago and Boston, leaving that company in March, 1918, to enter the service of the Government. From that time until Jan. 1, 1919, when he became connected with the Chicago Pneumatic Tool Co., he was assistant manager of the steel and raw material section, Production division, of the Emergency Fleet Corporation.

## Personals

**Charles L. Fay**, of Cumberland, Md., who had been an official of the Davis Coal & Coke Co. for five years, has resigned. Mr. Fay will become manager of the Quaker City Coal & Coke Co., of Philadelphia, with offices in Cumberland.

During Mr. Fay's administration the Safety and Welfare department of the Davis Coal & Coke Co. expanded to large proportions and now has club houses, affording entertainment and instruction, at all the mining towns.

**George Wilkinson**, general superintendent of the Pacific Coast Coal Mines, Ltd., states that **Samuel D. Wark** has been appointed to re-open the company's mine at Suquamish, Vancouver Island. This mine has been inactive since 1914. Mr. Wark will unwater it, restore ventilation, and put it in shape for production.

**James Gray**, superintendent of the Harvard Coal Co., operating at East Princeton, B.C., reports that the colliery plant has been augmented by a modern screening system and that screened coal is to be shipped to Vancouver City where a good market is assured. Work is in progress on two seams of coal, one six feet and the other nine feet in thickness.

Almost coincident with the announcement of the retirement of F. M. Sylvester as managing director in British Columbia of the Granby Mining & Smelting Co. and the appointment as general manager of H. S. Monroe of New York, comes word from Prince Rupert that shipments of coking coal are being received by the company at Anyox from eastern British Columbia. This coal is being tried in the company's by-product ovens and it said to be giving satisfaction.

A bill has passed the House of Commons, Ottawa, Can., under which Coal Controller W. H. Armstrong is continued in charge of coal operations in district 18 (comprising the provinces of Alberta and British Columbia) for another year, and also by virtue of which all regulations and orders issued by him during the past year have been ratified.

**Newell G. Alford**, until recently chief engineer of the St. Bernard Mining Co., Earlinton, Ky., was appointed assistant to the president and chief engineer of this company with offices in Earlinton, Ky., effective June 2d.

**Ben Pulliam**, of Carrier Mills, Ill., was recently elected mine examiner for Saline County, Ill.

**Fred Vinton** has been promoted from private mine inspector of the mines of the Rochester & Pittsburgh Coal & Iron Co. and allied interests, to general superintendent of all the mines of these companies in Indiana and Jefferson counties, Pa.

**Thomas Scott**, of Coalgate, Okla., mine inspector for Oklahoma and having jurisdiction over the mines in the eastern part of that state, was killed in the Folom-Morris Coal Co.'s No. 7 mine at Phillips,

Okla., recently, by a runaway car. Mr. Scott was inspecting the mine at the time.

**Eugene Dupuis**, who was connected with the New York Central lines for years and most recently division freight agent at Columbus, Ohio, has resigned to become traffic manager of the Philadelphia & Cleveland Coal Co., of Cleveland and Columbus. Mr. Dupuis will be located at Columbus.

**V. A. O. Gabany** has been made general superintendent of the Kentucky operations of the Bertha Coal Co. interests of Pittsburgh, Pa. His supervision will include the Elsie, Jessie and Sarah mines in the Whitesburg district of the Hazard field, in Kentucky, and the Isabella Mine at Blackie, Ky. The Sarah and Elsie mines were formerly the property of the West Virginia-Kentucky Coal Co., while the Jessie mine was operated by the Smoot Creek Coal Co.

**George C. Bucey**, formerly superintendent at the Goucher mine, Brilliant, Ohio, of the Consolidated Fuel Co., Pittsburgh, Pa., has taken charge of the new operations at Captina, W. Va., to be known as Frances mine No. 1. **Richard I. Redfern** has been made superintendent at the Goucher mine.

**Charles L. Snowden**, of Brownsville and Pittsburgh, Pa., former president of the Snowden Coke Co., near Brownsville, Pa., and interested in other Pennsylvania coal and coke operations, has resigned as president of the Brownsville town council.

**L. G. Shipley** has been appointed on the staff of the Lake & Export Corporation with headquarters in Huntington, W. Va., having resigned as a car distributor for the Chesapeake & Ohio R.R. at Thurmond, W. Va., to accept that position.

**Ernest F. Hensley** has been appointed district manager of the Boone Coal Sales Co. which has just opened branch offices at Huntington, W. Va.

**Charles A. Sandberg** has been appointed as Charleston manager of the Interstate Coal & Dock Co. Mr. Sandberg until recently was general manager of the mines of the Chesapeake & Ohio R.R.

**Gordon K. Nigh** has been placed in charge of the newly opened office of the Interstate Coal & Dock Co. at Huntington, W. Va.

**Lamson Blenkinsopp** has been appointed chief mine inspector of the State of Kentucky. Mr. Blenkinsopp was formerly a district mine inspector in West Virginia with headquarters at Landgraaf. About four years ago he resigned, however, to take charge of a number of Kentucky operations as manager. His ability as a mining man soon attracted the attention of the public officials of Kentucky and led to his appointment as head of the Kentucky Department of Mines, with headquarters at Lexington, Ky.

**T. H. Huddy** has been appointed general manager of the Williamson Coal & Coke Co., Bailey Coal Co. and of the Sudduth Coal Co., his appointment having become effective on June 1. For some time Mr. Huddy has been the general superintendent of the Boomer Coal & Coke Co. and of the Paint Creek Coal Mining Co., in the Kanawha field.

The following men have been appointed as foreign managers of the Westinghouse Electric International Co.: **F. M. Rodgers**, of London, England, European manager; **J. W. White**, Royal Bank of Canada Building, Havana, Cuba, manager for Cuba; **L. T. Peck**, Bartolome Mitre, 754, Buenos Aires, manager for the Argentine.

Several appointments have been made in the organization of the Westinghouse Electric International Co. At East Pittsburgh they are as follows: **H. F. Griffith**, assistant to general manager; **R. W. Everson**, manager of the Merchandising Department; **H. C. Soule**, manager of the Apparatus Department; and **H. S. Reizenstein**, manager of the Price Department. In New York they are: **G. H. Bucher**, assistant to the general manager; **J. H. Payne**, supervisor of agencies; and **F. M. Sammis**, manager of the Incandescent Lamp Department. **A. B. Cole**, assistant manager, of the Department of Publicity, Westinghouse Electric & Manufacturing Co., has been placed in charge of the advertising and promotion work for the Westinghouse International Co.

In rearranging the personnel of the Railway Department of the Westinghouse Electric & Manufacturing Co., of East Pittsburgh, Pa., promotions have been made as follows: **W. R. Stinemetz** is manager of the Heavy Traction section, with **Franklin W. Carter** in charge of both Foreign and Domestic negotiations; **E. D. Lynch** is manager of the Light Traction Equipment section with **George Skipton** in charge of negotiations; **J. L. Crouse** is manager of the new Railway Apparatus and Supply section

and **K. A. Simmon** is manager of the Safety Car and Foreign Railway Equipment section.

## Obituary

**Whitfield P. Pressinger**, of New York, vice president of the Chicago Pneumatic Tool Co., died June 10 as a result of complications following an operation. Mr. Pressinger was actively engaged in the pneumatic tool and allied machinery industry for many years. He was general manager of the Clayton Air Compressor Co. for seven years and became widely known through numerous activities in the American Society of Mechanical Engineers and the Compressed Air Society. He was born in New York City in 1871.

**William Lancaster**, Inspector of Mines for the Kootenay district, B.C., Canada, was killed instantly on May 29 when his motor car overturned on the Coal Creek mine road. He was on his way to inspect the mines of the Crow's Nest Pass Coal Co. Mr. Lancaster had been inspector for three years and was a much esteemed Government official.

## Trade Catalogs

**Westinghouse Insulating Materials and Supplies**. Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa. Pp. 25; 4 x 7 in.; illustrated. Miniature Catalogue 5 A-1. Notes about the materials specified in the title of catalogue.—Advertiser.

**Barnstead Patent Water Purifier and Still**. Barnstead Still & Sterilizer Co., Forest Hills, Boston, Mass. Pp. 19; 7 1/2 x 10 1/2 in.; illustrated. Description of the various stills made by the Barnstead company, and the operation of the apparatus.

## Coming Meetings

**American Mining Congress** will hold its annual meeting at Denver, Col., Nov. 15. Secretary, J. F. Callbreath, Munsey Building, Washington, D. C.

**American Institute of Mining & Metallurgical Engineers** will hold its fall meeting Aug. 20 to Sept. 3. It is proposed to leave Buffalo by steamer and cruise through the Lakes, the first stop being at Houghton, Mich., after which the party will visit Duluth and the Iron Ranges of Minnesota, spending a day or two in Minneapolis on its return. Secretary, Bradley Stoughton, 29 West 38th St., New York City.

**New York State Coal Merchants' Association** will hold its annual meeting Sept. 9, 10 and 11 at Richfield Springs, N. Y. Treasurer, G. W. F. Woodside, Albany, N. Y.

**Mine Inspectors' Institute of America** will hold its annual meeting July 13, 14 and 15 at Cleveland, Ohio. Secretary, J. W. Paul, Pittsburgh, Pa.

**Illinois and Wisconsin Retail Coal Dealers' Association's** annual meeting Aug. 4 and 5 at Milwaukee, Wis. Secretary, I. L. Runyan, Chicago, Ill.

**Indiana State First Aid Meet** at Clinton, Ind., July 5, under the auspices of the Indiana State First Aid Association, with the co-operation of the Clinton First Aid Association, Chamber of Commerce, Indiana Coal Operators' Association, United Mine Workers of America, Bureau of Mines, and State Mine Inspection Department.

**The Rocky Mountain Coal Mining Institute**, in conjunction with the Colorado Metal Mining Association, the local chapters of the American Mining Congress and the American Institute of Mining & Metallurgical Engineers, and the International First Aid Meet will hold its annual meeting Sept. 9, 10 and 11 at Denver, Col. Secretary, F. W. Whiteside, Denver, Col.

**National Safety Council** will hold its 1920 congress on Sept. 27 to Oct. 1, inclusive, at Milwaukee, Wis. General Manager, C. W. Price, Chicago, Ill.

**Oklahoma Coal Operators' Association** will hold its annual meeting Sept. 14 at McAlester, Okla. Secretary, F. F. La Grave, McAlester, Okla.

# CURRENT PRICES—MATERIALS & SUPPLIES

## IRON AND STEEL

**PIG IRON**—Quotations compiled by the Matthew Addy Company:

|  | Current     | One Month Ago |
|--|-------------|---------------|
| <b>CINCINNATI</b>  |             |               |
| No. 2 Southern   | \$45.60     | \$44.60       |
| Northern Basic   | 42.80       | 42.80         |
| Southern Ohio No. 2  | 46.80       | 43.80         |
| <b>NEW YORK</b> , Tidewater delivery                         |             |               |
| 2X Virginia (silicon 2.25 to 2.75)                           | 49.65       | 47.65         |
| Southern No. 2 (silicon 2.25 to 2.75)                        | 49.70       | 47.70         |
| <b>BIRMINGHAM</b>  |             |               |
| No. 2 Foundry  | 42.00@44.00 | 41.00         |
| <b>PHILADELPHIA</b>  |             |               |
| Eastern Pa., No. 2 x 2.25-2.75 sil.                          | 46.00@48.25 | 45.35-46.35*  |
| Virginia No. 2   | 45.00*      | 43.25*        |
| Basic  | 44.50†      | 43.00†        |
| Grey Forge   | 43.50*      | 42.50*        |
| <b>CHICAGO</b>   |             |               |
| No. 2 Foundry Local  | 44.25       | 43.25         |
| No. 2 Foundry Southern                                       | 47.00       | 46.60         |
| <b>PITTSBURGH</b> , including freight charge from the Valley |             |               |
| No. 2 Foundry Valley   | 45.65       | 43.65         |
| Basic  | 44.40       | 42.90         |
| Bessemer   | 44.90       | 43.40         |
| <b>MONTREAL</b>  |             |               |
| Silicon 2.25 to 2.25%  | 43.25       | 43.25         |

\* F. o. b. furnace. † Delivered.

**STRUCTURAL MATERIAL**—The following are the base prices, f.o.b. mill, Pittsburgh, together with the quotations per 100 lb. from warehouses at the places named:

|                                   | Mill        | —New York— | St. Louis    | Chicago |
|-----------------------------------|-------------|------------|--------------|---------|
|                                   | Pittsburgh  | Current    | One Year Ago |         |
| Beams, 3 to 15 in.                | \$2.45@3.75 | \$4.47     | \$3.47       | \$4.04  |
| Channels, 3 to 15 in.             | 2.45@3.75   | 4.47       | 3.47         | 4.04    |
| Angles, 3 to 6 in., 1/2 in. thick | 2.45@3.75   | 4.47       | 3.47         | 4.04    |
| Tees, 3 in. and larger            | 2.45@3.75   | 4.47       | 3.52         | 4.04    |
| Plates                            | 2.65@3.75   | 4.67       | 3.47         | 4.24    |

**BAR IRON**—Prices in cents per pound at cities named are as follows:

|  | Pittsburgh | Cincinnati | St. Louis | Birmingham |
|--|------------|------------|-----------|------------|
|  | 4.25       | 4.50       | 4.50      | 5.00       |

**NAILS**—Prices per keg from warehouse in cities named:

|      | Mill       | St. Louis | Birmingham | San Francisco |
|------|------------|-----------|------------|---------------|
|      | Pittsburgh | Louis     | Chicago    |               |
| Wire | \$4.00     | None      | \$4.15     | \$5.75        |
| Cut  |            | None      | 7.00       | 8.50          |

**TRACK SUPPLIES**—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

|   | Pittsburgh | Chicago | St. Louis | Cincinnati | San Francisco | Birmingham |
|---|------------|---------|-----------|------------|---------------|------------|
| Standard railroad spikes 1/2-in. and larger | \$4.00     | \$3.62  | \$5.34    | \$4.25     | \$5.65        | \$6.00     |
| Track bolts                                 | 6@6.50     | 4.62    | 6.50      | 5.50       | 6.65          | 7.50       |
| Standard section angle bars                 | 3@4        | 3.02    | 3.00      |            | 4.90          |            |

**COLD FINISHED STEEL**—Warehouse prices are as follows:

|   | New York | Chicago | Cincinnati | St. Louis |
|---|----------|---------|------------|-----------|
| Round shafting or screw stock, per 100 lb. base | \$6.25   | \$5.80  | \$6.50     | \$5.90    |
| Flats, squares and hexagons, per 100 lb. base   | 6.75     | 6.30    | 6.85       | 6.40      |

**HORSE AND MULE SHOES**—Warehouse prices per 100 lb. in cities named:

|          | Mill       | St. Louis | Birmingham |
|----------|------------|-----------|------------|
|          | Pittsburgh | Chicago   |            |
| Straight | \$5.75     | \$7.00    | \$7.00     |
| Assorted | 5.85       | 7.15      | 7.15       |

Cincinnati—Horseshoe nails sell for \$4.50 to \$5 per 25-lb. box.

**CAST-IRON PIPE**—The following are prices per net ton for carload lots:

|                | Current | One Month Ago | One Year Ago | Chicago | St. Louis | San Francisco |
|----------------|---------|---------------|--------------|---------|-----------|---------------|
| 4 in.          | \$79.30 | \$75.30       | \$53.00      | \$78.80 | \$78.00   | \$97.55       |
| 6 in. and over | 76.30   | 72.30         | 50.00        | 75.80   | 75.00     | 94.55         |

Gas pipe and 16-ft. lengths are \$1 per ton extra.

**STEEL RAILS**—The following quotations are per ton f.o.b. Pittsburgh and Chicago for carload or larger lots. For less than carload lots 5c. per 100 lb. is charged extra:

|                           | Pittsburgh  | Chicago           |
|---------------------------|-------------|-------------------|
|                           | Current     | One Year Ago      |
| Standard Bessemer rails   | \$45@60     | \$45.00 @ \$55.00 |
| Standard openhearth rails | 47@60       | 47.00 @ 57.00     |
| Light rails, 8 to 10 lb.  | 50.00@55.00 | 2.585* @ 3.75*    |
| Light rails, 12 to 14 lb. | 49.00@55.00 | 2.54* @ 3.75*     |
| Light rails, 25 to 45 lb. | 49.00@75.00 | 2.45* @ 3.75*     |

\* Per 100 lb.

**OLD MATERIAL**—The prices following are per gross ton paid to dealers and producers in New York. In Chicago and St. Louis the quotations are per net ton and cover delivery at the buyer's works, including freight transfer charges:

|                         | New York | Chicago | St. Louis |
|-------------------------|----------|---------|-----------|
| No. 1 railroad wrought  | \$29.00  | \$25.50 | \$28.00   |
| Stove plate             | 24.00    | 28.00   | 20.50     |
| No. 1 machinery cast    | 39.00    | 36.00   | 37.00     |
| Machine shop turnings   | 15.00    | 10.00   | 13.00     |
| Cast borings            | 16.50    | 12.50   | 15.50     |
| Railroad malleable cast | 28.00    | 25.50   | 27.00     |
| Relaying rails          | 52@54    | 50@55   | 50@55     |

**COAL BIT STEEL**—Warehouse price per pound is as follows:

|  | New York | Cincinnati | Birmingham | St. Louis  | Chicago |
|--|----------|------------|------------|------------|---------|
|  | \$0.10   | \$0.16†    | \$0.18     | 40@45% off | \$0.15  |

**DRILL STEEL**—Warehouse price per pound:

|                  | New York | St. Louis | Birmingham |
|------------------|----------|-----------|------------|
| Solid            | 12@14c.  | 13c.      | 15c.       |
| Hollow, 1/2 hex. | 17c.     |           |            |

**PIPE**—The following discounts are to jobbers for carload lots on the Pittsburgh basing card, discounts on steel pipe, applying as from January 14, 1920, and on iron pipe from January 7, 1920:

|              | Steel Black | Galv.           | Inches       | Iron Black      | Galv.           |
|--------------|-------------|-----------------|--------------|-----------------|-----------------|
| 1/2 to 3     | 57 1/2 @ 54 | 44 @ 40 1/2     | 1/2 to 1 1/2 | 34 1/2 @ 24 1/2 | 18 1/2 @ 8      |
| 2            | 50 1/2 @ 47 | 38 @ 34 1/2     | 2            | 28 1/2 @ 20 1/2 | 14 1/2 @ 6 1/2  |
| 2 1/2 to 6   | 53 1/2 @ 50 | 41 @ 37 1/2     | 2 1/2 to 6   | 30 1/2 @ 22 1/2 | 17 1/2 @ 9 1/2  |
| 1/2 to 1 1/2 | 45 1/2 @ 42 | 35 @ 31 1/2     | 1/2 to 1 1/2 | 34 1/2 @ 24 1/2 | 19 1/2 @ 9 1/2  |
| 2            | 48 1/2 @ 45 | 37 1/2 @ 33 1/2 | 2            | 29 1/2 @ 21 1/2 | 16 1/2 @ 3      |
| 2 1/2 to 4   | 51 1/2 @ 48 | 40 @ 36 1/2     | 2 1/2 to 4   | 31 1/2 @ 23 1/2 | 19 1/2 @ 11 1/2 |
| 4 1/2 to 6   | 50 1/2 @ 47 | 39 @ 35 1/2     | 4 1/2 to 6   | 30 1/2 @ 22 1/2 | 18 1/2 @ 10 1/2 |

Stocks discounts in cities named are as follows:

|  | —New York— | —Cleveland— | —Chicago— |
|--|------------|-------------|-----------|
|  | Black      | Galvanized  | Black     |
| 3 to 3 in. steel butt welded   | 40%        | 24%         | 40%       |
| 3 1/2 to 3 in. steel lap welded  | 35%        | 20%         | 42%       |
| Malleable fittings, Class B and C, from New York stock sell at list - 23%. |            |             |           |
| Cast iron, standard sizes, net.  |            |             |           |

**WIRE ROPE**—Discounts from list price on regular grades of bright and galvanized are as follows:

|  | New York and St. Louis |
|--|------------------------|
| Hercules red stand, all constructions                | 20%                    |
| Patent flattened strand, special and cast steel      | 20%                    |
| Patent flattened strand, iron rope                   | 5%                     |
| Plow steel round strand rope                         | 30%                    |
| Special steel round strand rope                      | 30%                    |
| Cast steel round strand rope                         | 22 1/2%                |
| Iron strand and iron tiller                          | 5%                     |
| Galvanized iron rigging and guy rope                 | +12%                   |
| San Francisco: Galvanized, less 5%, bright less 25%. |                        |
| Chicago, +12% on galvanized, 30 off on bright.       |                        |

**SHEETS**—Quotations are in cents per pound in various cities from warehouse; also the base quotations from mill:

|                 | Large       | St. Louis | Chicago | New York    | One Year Ago |
|-----------------|-------------|-----------|---------|-------------|--------------|
|                 | Mill Lots   |           |         | Current     |              |
| Blue Annealed   |             |           |         |             |              |
| No. 10          | \$3.55@7.00 | \$7.09    | \$7.02  | \$6.62@8.00 | \$4.57       |
| No. 12          | 3.60@7.05   | 7.09      | 7.07    | 6.67@8.05   | 4.62         |
| No. 14          | 3.65@7.10   | 7.09      | 7.12    | 6.22@8.10   | 4.67         |
| No. 16          | 3.75@7.20   | 7.09      | 7.17    | 6.82@8.20   | 4.77         |
| Black:          |             |           |         |             |              |
| *Nos. 18 and 20 | 4.15@7.30   | 8.10      | 7.80    | 7.80@8.80   | 5.17         |
| *Nos. 22 and 24 | 4.20@7.35   | 8.10      | 7.85    | 7.85@8.85   | 5.22         |
| *No. 26         | 4.25@7.40   | 8.10      | 7.90    | 7.90@8.90   | 5.27         |
| *No. 28         | 4.35@7.50   | 8.10      | 8.00    | 8.00@9.00   | 5.37         |
| Galvanized:     |             |           |         |             |              |
| No. 10          | 5.80@7.50   | 9.60      | 8.50    | 8.25@10.00  | 5.50         |
| No. 12          | 4.80@7.60   | 9.60      | 8.60    | 8.35@10.10  | 5.55         |
| No. 14          | 4.80@9.60   | 9.60      | 8.60    | 8.35@10.10  | 5.60         |
| Nos. 18 and 20  | 5.10@7.90   | 9.60      | 8.90    | 8.65@10.40  | 5.90         |
| Nos. 22 and 24  | 5.25@8.05   | 9.60      | 9.05    | 8.80@10.55  | 6.05         |
| *No. 26         | 5.40@8.20   | 9.60      | 9.20    | 8.95@10.70  | 6.20         |
| *No. 28         | 5.70@8.50   | 9.60      | 9.50    | 9.25@11.00  | 6.50         |

\* For painted corrugated sheets add 30c. per 1,000 lb. for 5 to 28 gage; 25c. for 19 to 24 gages; for galvanized corrugated sheets add 15c. all gages.

## SHOP SUPPLIES

**NUTS**—From warehouse at the places named, on fair size orders, the following amount is deducted from list:

|                      | —New York— | —Chicago— | St. Louis |
|----------------------|------------|-----------|-----------|
|                      | Current    | Current   | Current   |
| Hot pressed square   | \$4.00     | \$1.28    | \$2.25    |
| Hot pressed hexagon  | 4.00       | .85       | 2.00      |
| Cold punched square  | 4.00       | 1.00      | 1.30      |
| Cold punched hexagon | 4.00       | 1.00      | 1.30      |

Semi-finished nuts,  $\frac{1}{2}$  and smaller, sell at the following discounts from list price:

|                | Current | One Year Ago |
|----------------|---------|--------------|
| New York.....  | 30%     | 50-10%       |
| Chicago.....   | 50%     | 50%          |
| Cleveland..... | 50%     | 60-10-10%    |
| St. Louis..... | 45%     |              |

**MACHINE BOLTS**—Warehouse discounts in the following cities:

|   | New York | Cleveland | Chicago |
|---|----------|-----------|---------|
| By 4 in. and smaller.....                   | list     | 20%       | 20%     |
| Larger and longer up to 1 in. by 30 in..... | +20%     | 20%       | 20%     |

**WASHERS**—From warehouses at the places named the following amount is deducted from list price:

For wrought-iron washers:

New York..... list Cleveland..... \$3.00 Chicago..... \$3.00

For cast-iron washers the base price per 100 lb. is as follows:

New York..... \$7.00 Cleveland..... \$4.50 Chicago..... \$4.25

**RIVETS**—The following quotations are allowed for fair sized orders from warehouse:

|                                      | New York | Cleveland | Chicago |
|--------------------------------------|----------|-----------|---------|
| Steel $\frac{1}{2}$ and smaller..... | 30%      | 30%       | 30%     |
| Tinned.....                          | 30%      | 30%       | 30%     |

Boiler,  $\frac{1}{2}$ , 1, 1 in. diameter by 2 in. to 5 in. sell as follows per 100 lb.:

New York..... \$6.00 base Chicago..... \$5.62 Pittsburgh..... \$4.72

Structural, same sizes:

New York..... \$7.10 Chicago..... \$5.72 Pittsburgh..... \$4.82

## CONSTRUCTION MATERIALS

**LINSEED OIL**—These prices are per gallon:

|                       | New York | Chicago      |
|-----------------------|----------|--------------|
|                       | Current  | One Year Ago |
| Raw, 5-bbl. lots..... | \$1.58   | \$1.90       |
| 5-gal. cans.....      | 1.60*    | 2.03         |

\*To this oil price must be added the cost of the cans (returnable), which is \$2.25 for a case of six.

**WHITE AND RED LEAD**—Base price.

|                         | Current | Red    | 1 Year Ago | White  | Current        | 1 Year Ago     |
|-------------------------|---------|--------|------------|--------|----------------|----------------|
|                         | Dry     | In Oil | Dry        | In Oil | Dry and In Oil | Dry and In Oil |
| 100-lb. keg.....        | 15.50   | 17.00  | 13.00      | 14.50  | 15.50          | 13.00          |
| 25 and 50-lb. kegs..... | 15.75   | 17.25  | 13.25      | 14.75  | 15.75          | 13.25          |
| 124-lb. keg.....        | 16.00   | 17.50  | 13.50      | 15.00  | 16.00          | 15.50          |
| 5-lb. cans.....         | 18.50   | 20.00  | 15.00      | 16.50  | 18.50          | 15.00          |
| 1-lb. cans.....         | 20.50   | 22.00  | 16.00      | 17.50  | 20.50          | 16.00          |

500 lb. lots less 10% discount. 2000 lb. lots less 10-21% discount.

**COMMON BRICK**—The prices per 1000 in cargo or carload lots are as follows:

|                        | Chicago | Cincinnati | Birmingham |
|------------------------|---------|------------|------------|
| Chicago.....           | \$15.00 |            |            |
| St. Louis, salmon..... | 20.00   |            |            |

**PREPARED ROOFINGS**—Standard grade rubbered surface, complete with nails and cement, costs per square as follows at manufacturing points:

|                  | 1-Ply  | 2-Ply  | 3-Ply  |
|------------------|--------|--------|--------|
|                  | c.l.   | c.l.   | c.l.   |
| No. 1 grade..... | \$2.40 | \$2.90 | \$3.45 |
| No. 2 grade..... | 2.15   | 2.00   | 3.10   |

Slate-surfaced roofing (red and green) in rolls of 108 sq. ft. costs \$3.50 per roll in carload lots and \$3.75 for smaller quantities.

Shingles, red and green slate finish, cost \$7.75 per square in carloads; \$8.00 in smaller quantities, in Philadelphia.

**ROOFING MATERIALS**—Prices per ton f.o.b. New York and Chicago:

|  | Tar felt (14 lb. per square of 100 sq. ft.) per roll..... | Tar pitch (in 400-lb. bbl.) per 100 lb..... | Asphalt pitch (in barrels) per ton..... | Asphalt felt (light) per ton..... | Asphalt felt (heavy) per ton..... |
|--|---|---|---|-----------------------------------|-----------------------------------|
|  | \$3.50  | 1.85  | 46.50                                   | 118.00                            | 119.50                            |

**HOLLOW TILE**—Price per block in carload lots for hollow building tile:

|                  | 4x12x12 | 8x12x12        | 12x12x12 |
|------------------|---------|----------------|----------|
| Minneapolis..... | \$0.087 | \$0.158        | \$0.248  |
| St. Louis.....   |         | none on market |          |
| Seattle.....     | .09     | .175           | .30      |
| New Orleans..... | .238    | .304           | .43      |
| Chicago.....     | .1516   | .2728          | .4093    |
| Cincinnati.....  | .125    | .2186          | .3286    |
| Birmingham.....  | .1265   | .232           |          |

**LUMBER**—Price of pine per M in carload lots:

|                 | 1-In. Rough     | 2-In. T. and G. | 8 x 8 In. x 20 Ft. |
|-----------------|-----------------|-----------------|--------------------|
|                 | 10 In. x 16 Ft. | 10 In. x 16 Ft. |                    |
| St. Louis.....  | \$32.00         | \$38.09         | \$40.00            |
| Birmingham..... | 65.00           | 54.00           | 41.00              |
| Cincinnati..... | 55.00           | 50.00           | 50.00              |

**EXPLOSIVES**—Price per pound of dynamite in small lots and price per 25-lb. keg for black powder:

|                  | Low Freezing | Gelatin  | Black Powder |
|------------------|--------------|----------|--------------|
|                  | 20%          | 60%      |              |
| New York.....    | \$0.3425     | \$0.3425 | \$2.30       |
| Boston.....      | .27          | .30      | 2.45         |
| Kansas City..... | .26          | .385     | 2.40         |
| New Orleans..... | .2275        | .2475    |              |
| Seattle.....     | .2175        | .2475    | 2.45         |
| Chicago.....     | .2525        | .2975    | 2.45         |
| St. Paul.....    | .2275        | .2525    | 2.25         |
| St. Louis.....   | .26          | .285     | 1.90         |
| Los Angeles..... | .30          | .35      | 2.95         |

## MISCELLANEOUS

**GREASES**—Prices are as follows in the following cities in cents per pound for barrel lots:

|                      | Cincinnati | St. Louis | Birmingham |
|----------------------|------------|-----------|------------|
| Cup.....             | 8.5        | 8.5       | 8.5        |
| Fiber or sponge..... | 9.         | 8.5       | 8.5        |
| Transmission.....    | 10.        | 12 @ 14   | 8.5        |
| Axle.....            | 5.         | 5.5 @ 6   | 5.5        |
| Gear.....            | 6.5        | 6.5 @ 6.5 | 8.5        |
| Car journal.....     | 12.0       | 8.5 @ 9.5 | 4.5        |

**BABBITT METAL**—Warehouse prices in cents per pound:

|                 | New York | Cleveland    | Chicago |
|-----------------|----------|--------------|---------|
|                 | Current  | One Year Ago | Current |
| Best grade..... | 90.00    | 87.00        | 74.50   |
| Commercial..... | 50.00    | 42.00        | 21.50   |

**HOSE**—Following are prices of various classes of hose:

| Fire                     |                           |                  | 50-Ft. Lengths |
|--------------------------|---------------------------|------------------|----------------|
| Underwriters' 2½-in..... |                           |                  | 85c. per ft.   |
| Common, 2½-in.....       |                           |                  | 30%            |
|                          | Air                       |                  |                |
|                          | First Grade               | Second Grade     | Third Grade    |
| ¾-in. per ft.....        | \$0.60                    | \$0.40           | \$0.30         |
| First grade.....         | 20%                       | 30%              | 45%            |
|                          | Steam—Discounts from list |                  |                |
|                          | Second grade.....         | Third grade..... |                |

**LEATHER BELTING**—Present discounts from list in fair quantities (1/2 doz. rolls):

|  | Light Grade | Medium Grade | Heavy Grade |
|--|-------------|--------------|-------------|
|  | 30%         | 30%          | 20%         |

**RAWHIDE LACING**—(For cut, best grade, 25%, 2nd grade, 30%. For laces in sides, best, 79c. per sq. ft.; 2nd, 75c. Semi-tanned: cut, 20%; sides, 83c. per sq. ft.)

**PACKING**—Prices per pound:

|  |        |
|--|--------|
| Rubber and duck for low-pressure steam.....  | \$1.00 |
| Asbestos for high-pressure steam.....  | 1.70   |
| Duck and rubber for piston packing.....  | 1.00   |
| Flax, regular.....   | 1.20   |
| Flax, waterproofed.....  | 1.70   |
| Compressed asbestos sheet.....   | .90    |
| Wire insertion asbestos sheet.....   | 1.50   |
| Rubber sheet.....  | .50    |
| Rubber sheet, wire insertion.....  | .70    |
| Rubber sheet, duck insertion.....  | .50    |
| Rubber sheet, cloth insertion.....   | .30    |
| Asbestos packing, twisted or braided, and graphited, for valve stems and stuffing boxes..... | 1.30   |
| Asbestos wick, 1/4- and 1-lb. balls.....   | .85    |

**MANILA ROPE**—For rope smaller than 1-in. the price is 1/2 to 2c. extra; while for quantities amounting to less than 600 ft. there is an extra charge of 1c. The number of feet per pound for the various sizes is as follows: 1-in., 8 ft.; 1 1/2-in., 6 ft.; 2-in., 4 ft.; 2 1/2-in., 3 ft.; 3-in., 2 ft.; 4-in., 2 ft.; 5-in., 2 ft.; 6-in., 2 ft.; 8-in., 2 ft.; 10-in., 2 ft.; 12-in., 2 ft.; 14-in., 2 ft.; 16-in., 2 ft.; 18-in., 2 ft.; 20-in., 2 ft.; 24-in., 2 ft.; 30-in., 2 ft.; 36-in., 2 ft.; 42-in., 2 ft.; 48-in., 2 ft.; 54-in., 2 ft.; 60-in., 2 ft.; 72-in., 2 ft.; 84-in., 2 ft.; 96-in., 2 ft.; 108-in., 2 ft.; 120-in., 2 ft.; 144-in., 2 ft.; 168-in., 2 ft.; 192-in., 2 ft.; 216-in., 2 ft.; 240-in., 2 ft.; 270-in., 2 ft.; 300-in., 2 ft.; 324-in., 2 ft.; 360-in., 2 ft.; 400-in., 2 ft.; 450-in., 2 ft.; 500-in., 2 ft.; 540-in., 2 ft.; 576-in., 2 ft.; 600-in., 2 ft.; 648-in., 2 ft.; 696-in., 2 ft.; 744-in., 2 ft.; 792-in., 2 ft.; 840-in., 2 ft.; 888-in., 2 ft.; 936-in., 2 ft.; 984-in., 2 ft.; 1032-in., 2 ft.; 1080-in., 2 ft.; 1128-in., 2 ft.; 1176-in., 2 ft.; 1224-in., 2 ft.; 1272-in., 2 ft.; 1320-in., 2 ft.; 1368-in., 2 ft.; 1416-in., 2 ft.; 1464-in., 2 ft.; 1512-in., 2 ft.; 1560-in., 2 ft.; 1608-in., 2 ft.; 1656-in., 2 ft.; 1704-in., 2 ft.; 1752-in., 2 ft.; 1800-in., 2 ft.; 1848-in., 2 ft.; 1896-in., 2 ft.; 1944-in., 2 ft.; 1992-in., 2 ft.; 2040-in., 2 ft.; 2088-in., 2 ft.; 2136-in., 2 ft.; 2184-in., 2 ft.; 2232-in., 2 ft.; 2280-in., 2 ft.; 2328-in., 2 ft.; 2376-in., 2 ft.; 2424-in., 2 ft.; 2472-in., 2 ft.; 2520-in., 2 ft.; 2568-in., 2 ft.; 2616-in., 2 ft.; 2664-in., 2 ft.; 2712-in., 2 ft.; 2760-in., 2 ft.; 2808-in., 2 ft.; 2856-in., 2 ft.; 2904-in., 2 ft.; 2952-in., 2 ft.; 3000-in., 2 ft.; 3048-in., 2 ft.; 3096-in., 2 ft.; 3144-in., 2 ft.; 3192-in., 2 ft.; 3240-in., 2 ft.; 3288-in., 2 ft.; 3336-in., 2 ft.; 3384-in., 2 ft.; 3432-in., 2 ft.; 3480-in., 2 ft.; 3528-in., 2 ft.; 3576-in., 2 ft.; 3624-in., 2 ft.; 3672-in., 2 ft.; 3720-in., 2 ft.; 3768-in., 2 ft.; 3816-in., 2 ft.; 3864-in., 2 ft.; 3912-in., 2 ft.; 3960-in., 2 ft.; 4008-in., 2 ft.; 4056-in., 2 ft.; 4104-in., 2 ft.; 4152-in., 2 ft.; 4200-in., 2 ft.; 4248-in., 2 ft.; 4296-in., 2 ft.; 4344-in., 2 ft.; 4392-in., 2 ft.; 4440-in., 2 ft.; 4488-in., 2 ft.; 4536-in., 2 ft.; 4584-in., 2 ft.; 4632-in., 2 ft.; 4680-in., 2 ft.; 4728-in., 2 ft.; 4776-in., 2 ft.; 4824-in., 2 ft.; 4872-in., 2 ft.; 4920-in., 2 ft.; 4968-in., 2 ft.; 5016-in., 2 ft.; 5064-in., 2 ft.; 5112-in., 2 ft.; 5160-in., 2 ft.; 5208-in., 2 ft.; 5256-in., 2 ft.; 5304-in., 2 ft.; 5352-in., 2 ft.; 5400-in., 2 ft.; 5448-in., 2 ft.; 5496-in., 2 ft.; 5544-in., 2 ft.; 5592-in., 2 ft.; 5640-in., 2 ft.; 5688-in., 2 ft.; 5736-in., 2 ft.; 5784-in., 2 ft.; 5832-in., 2 ft.; 5880-in., 2 ft.; 5928-in., 2 ft.; 5976-in., 2 ft.; 6024-in., 2 ft.; 6072-in., 2 ft.; 6120-in., 2 ft.; 6168-in., 2 ft.; 6216-in., 2 ft.; 6264-in., 2 ft.; 6312-in., 2 ft.; 6360-in., 2 ft.; 6408-in., 2 ft.; 6456-in., 2 ft.; 6504-in., 2 ft.; 6552-in., 2 ft.; 6600-in., 2 ft.; 6648-in., 2 ft.; 6696-in., 2 ft.; 6744-in., 2 ft.; 6792-in., 2 ft.; 6840-in., 2 ft.; 6888-in., 2 ft.; 6936-in., 2 ft.; 6984-in., 2 ft.; 7032-in., 2 ft.; 7080-in., 2 ft.; 7128-in., 2 ft.; 7176-in., 2 ft.; 7224-in., 2 ft.; 7272-in., 2 ft.; 7320-in., 2 ft.; 7368-in., 2 ft.; 7416-in., 2 ft.; 7464-in., 2 ft.; 7512-in., 2 ft.; 7560-in., 2 ft.; 7608-in., 2 ft.; 7656-in., 2 ft.; 7704-in., 2 ft.; 7752-in., 2 ft.; 7800-in., 2 ft.; 7848-in., 2 ft.; 7896-in., 2 ft.; 7944-in., 2 ft.; 7992-in., 2 ft.; 8040-in., 2 ft.; 8088-in., 2 ft.; 8136-in., 2 ft.; 8184-in., 2 ft.; 8232-in., 2 ft.; 8280-in., 2 ft.; 8328-in., 2 ft.; 8376-in., 2 ft.; 8424-in., 2 ft.; 8472-in., 2 ft.; 8520-in., 2 ft.; 8568-in., 2 ft.; 8616-in., 2 ft.; 8664-in., 2 ft.; 8712-in., 2 ft.; 8760-in., 2 ft.; 8808-in., 2 ft.; 8856-in., 2 ft.; 8904-in., 2 ft.; 8952-in., 2 ft.; 9000-in., 2 ft.; 9048-in., 2 ft.; 9096-in., 2 ft.; 9144-in., 2 ft.; 9192-in., 2 ft.; 9240-in., 2 ft.; 9288-in., 2 ft.; 9336-in., 2 ft.; 9384-in., 2 ft.; 9432-in., 2 ft.; 9480-in., 2 ft.; 9528-in., 2 ft.; 9576-in., 2 ft.; 9624-in., 2 ft.; 9672-in., 2 ft.; 9720-in., 2 ft.; 9768-in., 2 ft.; 9816-in., 2 ft.; 9864-in., 2 ft.; 9912-in., 2 ft.; 9960-in., 2 ft.; 10000-in., 2 ft.

|                                      | Boston  | New York | St. Louis | Chicago | Minneapolis | San Francisco | Birmingham | Los Angeles |
|--------------------------------------|---------|----------|-----------|---------|-------------|---------------|------------|-------------|
| 1-in. and larger, in 1200-ft. coils: |         |          |           |         |             |               |            |             |
| 1-in.....                            | \$0.304 | .29      | .265      | .275    | .275        | .27           | \$0.324    | .295        |
| 1 1/2-in.....                        | .29     | .265     | .275      | .275    | .275        | .27           | .295       | .265        |
| 2-in.....                            | .265    | .275     | .275      | .275    | .275        | .27           | .265       | .275        |
| 2 1/2-in.....                        | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 3-in.....                            | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 3 1/2-in.....                        | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 4-in.....                            | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 4 1/2-in.....                        | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 5-in.....                            | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 5 1/2-in.....                        | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 6-in.....                            | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 6 1/2-in.....                        | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 7-in.....                            | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 7 1/2-in.....                        | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 8-in.....                            | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 8 1/2-in.....                        | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 9-in.....                            | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 9 1/2-in.....                        | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 10-in.....                           | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 10 1/2-in.....                       | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 11-in.....                           | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 11 1/2-in.....                       | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 12-in.....                           | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 12 1/2-in.....                       | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 13-in.....                           | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 13 1/2-in.....                       | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 14-in.....                           | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 14 1/2-in.....                       | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 15-in.....                           | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 15 1/2-in.....                       | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 16-in.....                           | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 16 1/2-in.....                       | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 17-in.....                           | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 17 1/2-in.....                       | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 18-in.....                           | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 18 1/2-in.....                       | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 19-in.....                           | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 19 1/2-in.....                       | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 20-in.....                           | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 20 1/2-in.....                       | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 21-in.....                           | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 21 1/2-in.....                       | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 22-in.....                           | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 22 1/2-in.....                       | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |
| 23-in.....                           | .275    | .275     | .275      | .275    | .275        | .27           | .275       | .275        |